May 1, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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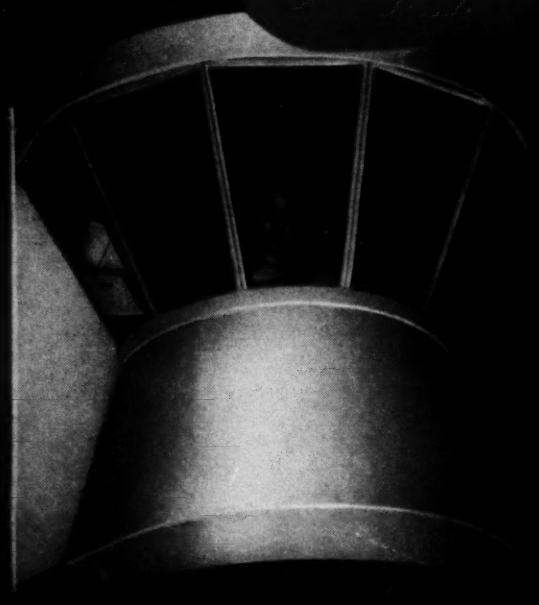
NEW WORLDS ARE JUST AHEAD.... AND IN THEM MOLTRUP PRODUCTS WILL PLAY AN IMPORTANT PART

Moltrup Steel Products Co., Beaver Falls, Pa.

Manufacturers of QUALITY KEY STOCK

FLATS, SQUARES, ROUNDS, HEXAGONS; SPECIAL STEEL SHAPES; MACHINE KEYS, MACHINE RACK; FOUNDRY PATTERN PLATES, CORE PLATES AND GROUND AND POLISHED PLATES

Happy



HE CAN WORK *Comfortably Seated* IN HIS NEW WHITING CRANE

NEW CAB and Controls Reduce "Operator FATIGUE"

Fresh and alert after a full day at the controls—this operator *should* be happy! Gone for him are the long hours of standing at the "drums," fighting heavy control handles – leaning, twisting, straining to spot the load.

Now he works comfortably seated in the new Whiting Full-Vision Cab, which provides excellent vision, a new ease of control, and virtually eliminates the old "crane operator fatigue."

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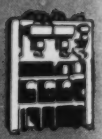
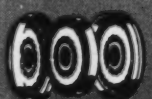
Herringbone Gears
These precision-cut gears provide quieter, more efficient speed reduction; longer life.

Magnetic Control
This compact, remote control system eliminates drum controls and provides delicate, finger tip handling of all crane movements.





Fluid Drive
Liquid transmits power between motors and drives. Gives even acceleration, smoother operation. Its cushioning effect reduces maintenance.

WHITING OVERHEAD TRAVELING CRANES

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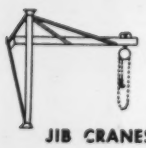
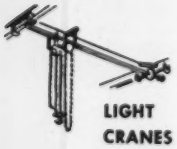


JIB CRANES

TRAMBEAM SYSTEMS



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Also: Foundry Equipment • Railroad Equipment • Metal-Working Machinery • Swenson Evaporators and Spray Dryers Food Freezers

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No. 1205 Veeder-Root Magnetic Counter (AC only) is compact, readily adaptable for building into many types of products as standard equipment. Counts to million, then resets. Specification sheet on request.

...give it a Sales Build-up with Built-in Magnetic Counters

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But if your product has a "hidden talent" for counting either electrically *or* mechanically, Veeder-Root engineers know how to discover and develop that talent . . . and how to enable your product *to talk to your customers in any terms they want.* In terms of any units of performance, production, volume, length, or what have you. Yes, Veeder-Root Counters not only help sell the products they're built into . . . they can even prove the product's service guarantee! Now, when would you like a "talent scout" to look at your product . . . *to see whether you can count yourself lucky, too?* Just write.

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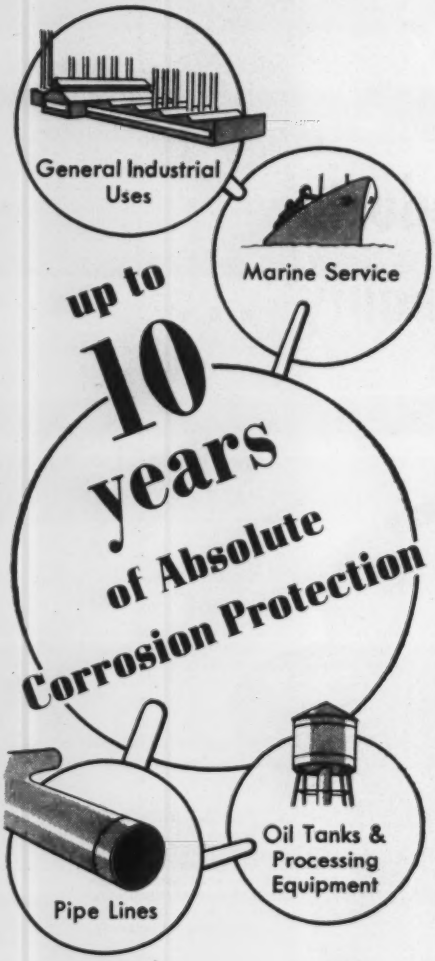

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4000
Coatings

Developed as a coating system for ship bottoms, Hysol now has been adapted for general industrial and oil field uses. Tough and abrasion-resistant, Hysol Coatings adhere firmly to any metal surface. *Write for specific information.*

- Resist attack from salt water and practically all chemicals.
- 8 colors.
- Easily applied using spray, brush, dip or roller methods.

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laboratories, inc.
OLEAN, NEW YORK

Behind the Scenes...

Coming Up

Ever cussed the government? News Editor Walt Campbell picks up his ears whenever he hears particularly strong complaints from industry. He heard them on the niggardly depreciation allowances allowed by the government on corporate income tax returns. Preliminary investigation convinced him that industry had a case, that something must be done about it.

Doing something about it for nearly two months now has been Associate Editor John Morgan. He has been interviewing metalworking people, accountants and lawyers who have been in personal combat with the government on the problem. He has been studying the varying opinions of authorities in the field. Next week he presents the findings—consensus on what should be done to solve the problem, the effects government policies have had on industry, the effects they will have if allowed to continue and many other aspects of the depreciation situation that you as an informed executive must know.

Next week's special report won't be the lone shot of a hit-them-and-run affair. It's the lead-off barrage in a sustained drive for depreciation reform. It will be one of a series of STEEL reports on the matter that will be coming your way for some time.

Steel Finances

Last week, STEEL's 25th annual financial analysis of the steel industry appeared as a special insert of the Apr. 24 issue. Associate Editor Vance Bell, the man who put out the fine job, tells us that a limited number of extra copies of the summary are available—single copies gratis, prices of larger quantities upon request.

Television Tempo

A friend of ours who works in the research department of General Electric Co. writes in to say he was visited one Saturday by a door-to-door salesman who was peddling dummy television aerials—$5.50 installed.

The auto accessory people have come out with a new gadget, a miniature wire arrangement that fits on your car aerial and looks like a small television antenna. We dropped in at an auto store to see how the device was moving. "Sensational," said a clerk. "This will be the biggest thing since the Buick port holes. It may even help your car radio reception."

A Man Behind the Scenes

One of STEEL's most valued correspondents has been in prison. He is Leon Jaudoin-Prom who was imprisoned by the Germans when they were occupying France during the war. The Nazis put the finger on him because he was defending the interests of French Blaw-Knox Co., of which he was president at the time.

Mr. Jaudoin has been French correspondent for us since 1927. He is a graduate of Ecole Nationale Superieure des Mines and also has a law degree. He served in World War I, part of the time as an instructor in artillery from the French Military Mission at Fort Sill, Okla.

From 1921 to 1935 he was associated with two French steel firms, Chatillon-Commentry and Pompey, in sales. Since 1935 he has been with French Blaw Knox. He is a specialist in the design of dams and tunnels. Mr. Jaudoin has also been engaged in the design of laboratory testing machines and equipment, particularly for metallurgy and mineralogy.

Puzzle Corner

D. A. Cotton of Anderson, Ind., was the first one in with the correct answer to the Apr. 17 puzzle about the rejected nuts. Al found 17 rejected nuts and Bill 14. Mr. Cotton says the problem can be solved by Horner's Method. You take it from there.

A. W. Everest of General Electric Co. submits this one: Place the 16 top cards from a standard 52-card deck in a square so that no horizontal or vertical row, or either diagonal, contains two cards of the same suit or denomination. Ace is high. There are numerous solutions.

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(Editorial Index—page 49)

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STEEL

The Magazine of Metalworking and Metalproducing

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Next Week ... **Stainless Fabricating Costs Cut $100 Daily ... New Flash Butt Welder Joins ¼-Inch Strip in 10 Seconds ... Production of Merchant Shapes ... Need for Depreciation Reform—A Special Report**

FOR DEPENDABLE LONG LIFE

insist on

Nickel Alloy Steel Gears

There are two kinds of nickel alloy steel gears . . . those that are carburized, and those that are direct hardened.

CARBURIZED GEARS

The carburized gear is used in applications that require maximum wear resistance in the surface, as well as greatest surface compressive strength. With nickel alloy carburizing steels, this goal is consistently attained, together with development of extremely tough cores that resist shock loads, fatigue and bending stresses. Moreover, a chief cause of noisy gears . . . the distortion that accompanies heat treating . . . is inherently resisted by nickel alloy carburizing steels.

DIRECT HARDENED GEARS

The direct hardened steel gear is used to carry heavy tooth loading in applications where resistance to wear and surface compressive stresses is not quite so vital a factor. Here again, the nickel-containing steels develop the required strength more consistently and in heavier sections than carbon steels, and are generally more resistant to shock, fatigue and multi-axial stresses. Distortion resulting from heat treatment may be minimized by using nickel alloy steels and their machinability before final heat treatment is very good.

Giving greater play to the skill of the engineer, nickel alloyed steels not only provide increased strength without sacrificing ductility, but they harden at lower temperatures which simplifies heat treatment and minimizes deformation and scaling.

MEET VARIED REQUIREMENTS

Nickel alloyed steels enable producers to meet virtually any reasonable requirements . . . whether dictated by revised stress analysis due to design changes, or by changed fabricating methods that demand better machining qualities or improved response to heat treatment.

MANY TYPES AVAILABLE

The many standard grades of nickel alloyed steels permit specifying the particular type which provides the best set of properties for any reasonable fabrication and service demands.

Unending competition for higher speeds and heavier loads, for quieter operating and longer machine life, provide opportunities for gear producers to drive ahead with nickel alloyed steels. Use the coupon for your copy of "Modern Trends in Nickel Steel and Cast Iron Gear Materials." This useful and informative booklet is yours for the asking. Send for it now.

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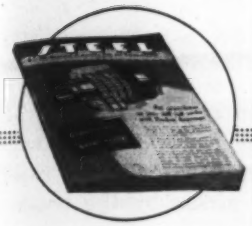


May 1, 1950

Roman Holiday

In his radio address before the Federal Bar Association last Monday night, President Truman went to great pains to explain the steps his administration is taking to rid the government of communists. It was clear that he resents the criticism of anybody who believes that the government has failed to do a thorough job in this respect. He was particularly vehement in his denunciation of "accusations based on gossip, hearsay or hunch" and of criticism based upon political motives.

One wonders how many persons who noted his tone of righteous indignation realize the extent to which the federal government, usually with the enthusiastic approval of the President, employs "accusations based on gossip, hearsay or hunch" to smear individuals and corporations who are marked for persecution for the sake of politics. Mr. Truman was feeling sorry for himself because he had fallen victim to tactics he has practiced with abandon upon others.

Two industrialists recently have lashed out against unfair government persecution. Speaking to the Baltimore Association of Commerce, Benjamin F. Fairless, president of United States Steel Corp., presented a classic description of a typical Congressional "investigation." The chairman "invites" you to appear before his committee. He issues a barrage of releases to the press telling the world what a dangerous character you are. At the opening of the hearings, the chairman reads a statement pronouncing you guilty. Then he announces the committee will proceed with a "full and impartial" investigation. At the end the chairman completely ignores all testimony presented, writes a report setting forth all of his preconceived notions and quotes from his opening statement to prove he was right all the time.

In similar vein, Charles M. White, president of Republic Steel Corp., addressed a strong letter to Emanuel Celler, chairman of the House Judiciary Subcommittee, protesting the "runaround" given him when he appeared to testify. Additional proof of the "grandstand" aspects of these investigations is found in the footnotes of recent Celler committee press releases warning newspapermen that press seats at the Roman inquisition will be at a premium.

It is good to see industrial spokesmen speak out against unjustified persecution. It will be even better to see a return to fair and honest tactics in government investigations.

* * *

DUBIOUS PROSPERITY: Some of the current production records are unbelievably good. Weekly steel output is at the fabulous annual rate of 100 million tons. Even with Chrysler idle, the automobile industry thus far this year has turned out 2 million units in the United States and Canada. If Chrysler resumes production shortly and no other strike hampers motordom, there is a good possibility that assemblies for the first half will be 3.7 million. On the basis of past performance, this is a fantastic figure.

Old timers in the motor industry marvel at the amazing sales records of February, March and April. Apparently the record breaking output of cars is being absorbed without an undue overloading of dealers' stocks. Explanations of this rash of buying during a spell of unfavorable weather vary. One is that people have cash from wartime earnings and profits not yet con-

(OVER)

sumed and from bonuses and subsidies. Another theory is that we are enjoying momentarily the effects of a type of inflation which has fattened pocketbooks proportionately more than it has pushed up the price of automobiles.

If this last mentioned explanation has merit, it raises a number of disturbing questions. To what extent is our present prosperity buoyed by the deficit spending by our government? Another is this: If the nation has to run $7 billion in the red in a period of record-breaking industrial activity, what will it do when the bloom is off the peach? —pp. 71, 139

* * *

IMPARTS WHIP ACTION: An Ohio manufacturer employs a novel method of converting rotary motion to reciprocating motion in hand tools for chipping, peening, channeling, gouging, etc. A ⅓ hp heavy duty motor operating at 10,000 rpm is geared down to an eccentric shaft which runs at 3000 rpm. The eccentric actuates a rocker arm and elongate beam assembly. A knob at the free end of the beam imparts reciprocating motion to a piston that strikes the shank of the work tool.

An important feature of this design is that resilient neoprene rubber blocks are inserted between the rocker arm and the elongate beam and on both sides of the knob where it engages the piston. The resiliency of the blocks imparts a "whip" action to the piston and permits it to increase the length of its stroke. The result is that this hand tool, weighing only 7½ pounds, can cut automobile fender stock at a speed of 6 inches per second or drill concrete at better than 1 inch per minute. —p. 89

* * *

LOWER FREIGHT RATES: As a result of a curious sequence of developments, some shippers of certain forms of rolled steel will enjoy at least a temporary reduction in shipping costs. Interstate Commerce Commission has granted the Eastern railroads their request for lower rates on carload shipments of 80,000 pounds or more. The reductions, effective May 1, average about 25 per cent and apply to items such as sheets, strip, pipe and wire in which competition between the rail carriers and highway truckers is keen.

The highway carriers had filed petitions for increases in their rates of 15 to 20 per cent, to become effective May 1. After the ICC granted the reduction in rail rates, the truckers reconsidered their position and finally decided to postpone any further action on rates until June 1. As matters now stand, the newly reduced rail rates afford a competitive advantage to the railroads which, pending new action by the truckers, will result in lower shipping costs on certain items. —p. 57

* * *

WHERE CASTINGS GO: According to a report of the Census of Manufactures for 1947, the machinery classification—"machinery, except electrical"—is the foundry industry's best customer. It accounted for 50.2 per cent of the total consumption of gray iron and malleable iron castings by metal fabricating plants, 59.3 per cent of steel castings, 64.6 per cent of copper and copper-base alloy castings and 41.7 per cent of aluminum and aluminum-base alloy castings. The report excludes castings produced and consumed in the same plant and iron castings consumed in the steel industry in the form of ingot molds, stools and rolls.

Transportation equipment ranked second in the consumption of iron, steel and aluminum castings. Fabricated metal products was second in the consumption of copper and copper-base alloy castings. Electrical machinery was third and fabricated metal products fourth in the use of iron castings. —p. 61

* * *

SIGNS OF THE TIMES: A recent poll in California shows that manufacturers in that state are somewhat more optimistic today than they were last January. Then only 70 per cent expected the first quarter to be better than the first quarter of 1949. In the latest survey 81 per cent expect their second quarter to equal or top the comparable 1949 period. Increased payrolls are planned by 33 per cent, 48 per cent expect payrolls to remain unchanged and 19 per cent expect reductions in their working forces.

Of manufacturers replying to the questionnaire, 31 per cent say that high taxes are the chief deterrent to good business, 29 per cent blame discriminatory freight rates and 23 per cent cite labor difficulties as one of industry's worst headaches. Significant is the fact that 13 per cent mentioned "cut-throat" competition as a business irritant. —p. 76

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

NEW FREIGHT RATES—It will pay you to buy steel in carloads of 40 tons or more (p. 57) because Eastern rail rates on some steel products go down an average of 25 per cent today—May 1. Generally, the reductions apply to lighter products that trucks can also carry. Steel buyers who get their shipments by truck will also benefit because a projected truck rate boost of 15 to 20 per cent scheduled to go into effect today has been postponed until June 1.

TOO GOOD TO BE TRUE?—We are in a record peacetime business boom, but is it just a temporary jag? (pp. 74-77) Some metalworking men warn against too much optimism. They say that less electric power is being consumed, soft coal production is declining and the consumer price index is rising. Bases for optimism are: STEEL's production index for the week ended Apr. 22 hit another new peak of 195; steel is pouring from furnaces at a 100-million-ton annual rate; and nearly 150,000 cars and trucks are rolling off assembly lines weekly despite the Chrysler shutdown (p.72).

DANGER SIGNALS—Steel warehousemen, taking a realistic look at their business prospects at an association meeting, fear that a trend begun in 1949 may continue into 1950. Last year steel warehouses received 14.6 per cent less steel than they got in the 1948 peak, but their dollar volume fell 21 per cent. Since the war, 600 new warehousing firms have been formed to handle a business volume that may be shrinking to more normal proportions.

BARK AND BITE—Embarrassed is Chairman Emanuel Celler of the House committee investigating economic power in the steel industry (p. 59). At the start of the hearings he made strong statements about getting the antitrust laws amended to break up big companies like U. S. Steel Corp. But he can't muster a majority on his committee to back him up. Because a committee chairman never writes a minority report, Mr. Celler must tone down his recommendations to get a majority to support them.

NEW SKIN—Watch for new applications and greater use of titanium enameling steel (p. 58). Westinghouse Electric Corp. is trimming costs by using it on cooking ranges. Inland Steel Co. sells it now as Ti-Namel. Other steel companies will be bringing out their new alloys soon.

BIG USER—Where do castings go? Census of Manufactures for 1947 says that the machinery classification—machinery except electrical—is the foundry industry's best customer (p. 61). That classification takes more iron, steel, copper and copper alloy, aluminum and aluminum alloy castings then are used by any other product group. Transportation equipment ranks second in consumption of iron, steel and aluminum castings. Fabricated metal products is second in consumption of copper and copper alloy castings.

SOUTHERN BOOSTER—Venezuelan iron ore may improve the South's economy (p. 69). Ports such as Mobile, Ala., will be logical entry points for the ore when it starts arriving in volume within three to five years. Southern steel consumers reason that more ore coming into their own back yard will eventually boost steel production in the region.

HERE AND THERE IN INDUSTRY—The Commerce Department is laying the groundwork for a new informational service to help you in selling to the government (p. 64) . . . General Electric Co. has run a ten-car train into New York city to show products for the production, distribution and utilization of electric power (p. 63) . . . Although many problems face the coal industry, leaders say it is not sick, just needs a favorable climate in which to work (p. 60) . . . Westinghouse Electric Corp. held its Machine Tool Electrification Forum in Buffalo Apr. 25-26 (p. 62) . . . Great Britain's machine tool builders have taken space at the Canadian Trade Fair to be held in Toronto beginning May 29 in a drive for Canadian business . . . A television tube maker is reducing his per-tube stainless steel requirements; gage has been reduced from 0.125 to 0.10 inch.

Production-Engineering News—p. 85 *Market Summary*—p. 139

Working Together for Faster Steel Service

Here's the team that swings into action the moment you contact a Ryerson plant. From the phone girl who receives your call to the driver who delivers your order it's a team of specialists who take pride in the job of getting steel to you quickly.

As soon as we take your order, duplicate copies are rushed to every person concerned and scheduling is completed simultaneously for all departments to prevent the slightest delay. In the warehouse, experienced steel men select your requirements from certified quality stocks. Carbon, alloy and stainless steels on hand in most every size, shape and finish make it easy for you to concentrate purchases—save time and develop lower costs. Then flame-cutters flash . . . friction saws roar . . . shears and punches crash. Your steel is prepared to exact specifications and rushed to the shipping floor according to schedule. A waiting truck speeds the steel to your door.

That's Ryerson steel service—a remarkable example of teamwork that enables us to ship steel in any form, to any place, in record time. Whenever you need high quality steel—need it fast—we urge you to call our nearest plant.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared & U. M. Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

TUBING—Seamless & welded, mechanical & boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

MACHINERY & TOOLS—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

STEEL
A PENTON PUBLICATION

Cheaper by the Big Carload

Railroads reduce rates on lighter products if they are shipped in 80,000-pound cars. Steel truckers postpone projected increase in tariffs until June 1

BUY steel in carlots of 40 tons or more? If so, your freight bill will be lower.

Eastern railroads were given the go-ahead signal on selective rate reductions on iron and steel products in carloads of 80,000 pounds minimum. The reductions average about 25 per cent, but in some instances amount to considerably more. They become effective today.

Not all steel products are included. The lower rates are offered on products commonly carried by truck and on which truck competition hurt the railroads the most. Generally, the reductions apply to the lighter products—sheet, strip, bars, rod, tin plate, wire, smaller pipe and tubing, nails. Shapes and large pipe and certain other heavy products do not benefit.

Stops Truck Rate Rise—Besides lower rail rates, metalworking companies that receive their steel by truck also will benefit. Steel truckers were planning to increase rates by 15 to 20 per cent May 1. When the Interstate Commerce Commission told the railroads to go ahead with their rate reductions, the truckers reconsidered and postponed their projected rate increase until June 1.

The truckers have not abandoned their plans for higher rates. But they are going to try to figure out some way to get more revenue and still remain competitive with the railroads in iron and steel transportation.

They may adopt a plan similar to that of the rail carriers and establish new minimums with varying rates.

Cheaper by Rail—Last week, it was cheaper to ship most products by truck within reasonable distances. Now it is cheaper to ship by rail those products on which the rates have been cut and which can be taken in 40-ton carlots.

The railroads estimate the rate reductions will save steel consumers and shippers nearly $20 million annually. In a recent one-week survey, the carriers found that shippers would have saved $370,000 had the new rates been in effect.

How Big A Saving?—Suppose your plant is located in Flint and you buy light flat-rolled steel from a Cleveland mill. Your old rail freight rate was 42 cents per hundred pounds. The new rate is 29 cents. You save $2.60 a ton if you can take 40-ton carloads. If you use 500 tons a month, you may save as much as $15,600 a year.

But if you are a small consumer and are unable to take 40-ton carloads, you must continue to pay the old rate. Possibly your larger competitors are benefiting by the new rates.

Unhappy Truckers—Motor carrier operators protested the rail action vigorously, saying it may force many truckers out of business.

They proposed a compromise by which the railroads would cut rates on iron and steel products by 10 per cent while the truckers proceeded to increase rates by 20 per cent. Then, they argued, both carriers would be on a fairly competitive basis. This argument fell on deaf ears at the ICC.

The railroads argue that the higher minimum weight on which their new rates are based still leaves the truckers with certain advantages. Not only do truck loads range well below 80,000 pounds, but the truckers are able to offer faster deliveries, particularly on shorter hauls. Another competitive advantage for the trucker is in the matter of shrouding. Shippers of some steel products, such as sheet and strip, require a protective outing covering for the purpose of preserving the finish. Railroads make a charge of 2½ cents per 100 pounds for shrouding. Truckers generally throw a tarpaulin over steel and charge no more.

Railroads' Buying Up

Freight car purchases for the first three months of 1950 are four times as large as in the comparable 1949 period. They totaled 20,725 units.

Backlog of new freight cars on order Apr. 1 totaled 28,765. Railroads will build 17,590 units and the remaining 11,175 will be built by car building companies.

Railroads bought 685 diesel locomotives in the first quarter, compared with 198 in the same period last year.

Old and New Freight Rates

WITHIN CENTRAL TERRITORY

Mileage Blocks	To	From	OLD (In cents per 100 lb)	NEW (In cents per 100 lb)
1 to 5	Sharpsville, Pa.	Sharon, Pa.	6	5
21 to 25	New Castle, Pa.	Youngstown	12	7
46 to 50	Alliance, O.	Sharon, Pa.	18	11
71 to 75	Ashland, O.	Cleveland	24	15
96 to 100	Fostoria	Cleveland	32	18½
121 to 130	Oil City, Pa.	Irvin, Pa.	34	21
141 to 150	Erie, Pa.	Pittsburgh	36	23
191 to 200	Lima, O.	Chicago	42	28
241 to 250	Flint, Mich.	Chicago	44	31
291 to 300	Detroit	Weirton, W. Va.	51	35
361 to 380	Indianapolis	Wheeling	57	42
451 to 475	Chicago	Pittsburgh	63	51

WITHIN, TO AND FROM TRUNK LINE AND NEW ENGLAND TERRITORIES

Mileage Blocks	To	From	OLD (In cents per 100 lb)	NEW (In cents per 100 lb)
41 to 45	Philadelphia	Coatesville, Pa.	15	11½
66 to 70	Rochester	Buffalo	23	16
96 to 100	York, Pa.	Bethlehem	32	20
141 to 150	Syracuse	Buffalo	36	26
191 to 200	Elmira, N. Y.	Bethlehem	42	31
241 to 250	Rochester	Cleveland	44	36
291 to 300	Hagerstown, Md.	Youngstown	51	39
426 to 450	Boston	Harrisburg, Pa.	62	50

Ti-Namel: A One-Coat Enameling Sheet

A basic open-hearth product and a killed steel, it derives its characteristics as a base for enamelware from the titanium-carbon combination

CO-OPERATION of Inland Steel, Westinghouse and several frit producers has made possible the use of Ti-Namel, Inland's titanium-bearing enameling sheet, with one coat of porcelain enamel, thin as an organic finish.

Westinghouse has been able to trim manufacturing costs of its cooking ranges while making them more serviceable. How? It simplified design, eliminated part of its enameling operations, and is saving on packing expense. There's a big hitch, though: Not enough of the special steel needed is available now.

Westinghouse, George D. Roper and several other users are still experimenting with Ti-Namel. Westinghouse is far and away the largest buyer of Inland's limited Ti-Namel output because of its application to home appliances.

No Secret — Several other steel makers may offer such material soon. Although they may not use titanium alloys, the alloys probably will have the physical and chemical properties that now make Ti-Namel a stand-out performer. Armco and Carnegie-Illinois are two of the big names that have new steels nearly ready for the molds. There are, it seems, no secret processes involved.

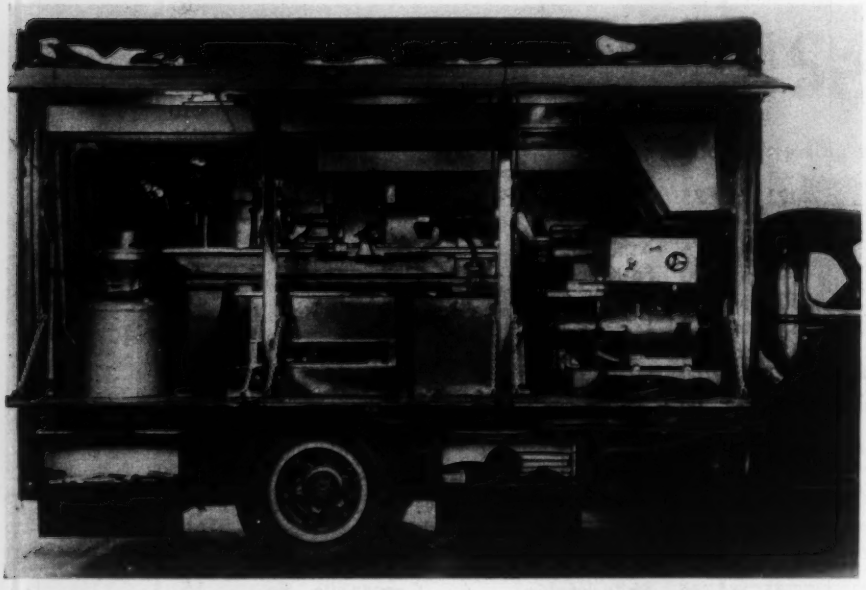
What is Ti-Namel? What makes it different from enameling irons? These are questions Inland people are hearing more frequently. The answer comes from a man close to its development, Frank R. Porter, Inland ceramic engineer. He lists as its nominal composition: Carbon 0.09 per cent max; manganese 0.50 per cent max; phosphorus 0.04 per cent max; sulphur 0.05 per cent max; and titanium 0.20-0.50 per cent. Titanium is added as low carbon ferrotitanium. A basic open-hearth product and a killed steel, Ti-Namel derives its most important characteristics as a base for enamelware from the titanium-carbon combination. Four times as much titanium as carbon is required, and because of the cost of the former the steelmaker's aim is to keep carbon content as low as is practical.

The resulting compound, titanium carbide, is stable, which means that the carbon is not free to "reboil" at enameling temperatures. Blisters, pits and black specks that necessitate a cobalt ground coat and one or more of the cover coats are eliminated.

No Chipping—Titanium steel has these advantages: 1. High sag and warp resistance at enameling temperatures; this means use of lighter gages without affecting the finished part's flatness; elimination of some bracing on large surfaces; 2. less enamel used, fewer firings; 3. enamel chipping reduced (in some cases phenomenally); 4. lower crating cost; 5. lighter over-all product weight, lower shipping cost.

One Coat—Prospective users will want to weigh these advantages against the product's drawbacks: The cost is higher.

Inland's Ti-Namel carries a base price of $6.90 per 100 lb against enameling iron at $4.40. Fabrication procedures must be carefully watched since deep scratches, die marks, etc., that normally are concealed by standard coatings will show through the one coat as thin as .004-.005 inch, which is now practical. Automatic spraying is highly desirable to give a more even coat. Strict control of the pickling and nickeling operations is very important. Users who are still experimenting warn that the product and the processes should be tried with caution until successful experience is gained.



MOBILE MACHINE SHOP: Mounted on trucks, machine shops like this are being bought by the Turkish government for repair of farm machinery. The units are sold by Davey Compressor Co., Kent, O. They are 8 x 14 feet; for basic power sources they have a 300 amp welder made by Lincoln Electric Co., Cleveland, a 60 cu ft air compressor and a 12 kw ac generator. The power units operate a lathe, a drill press, a grinder and other tools. The shops also have oxyacetylene equipment, work bench, arbor press, forge, mechanic's tools, blacksmith tools, plumber's tools and other small items

New Cold Drawing Success

Cold drawn seamless tubing of Rosslyn metal, copper core with stainless steel surfaces, has been successfully accomplished by American Cladmetals Co., Carnegie, Pa., says Joseph Kinney Jr., president.

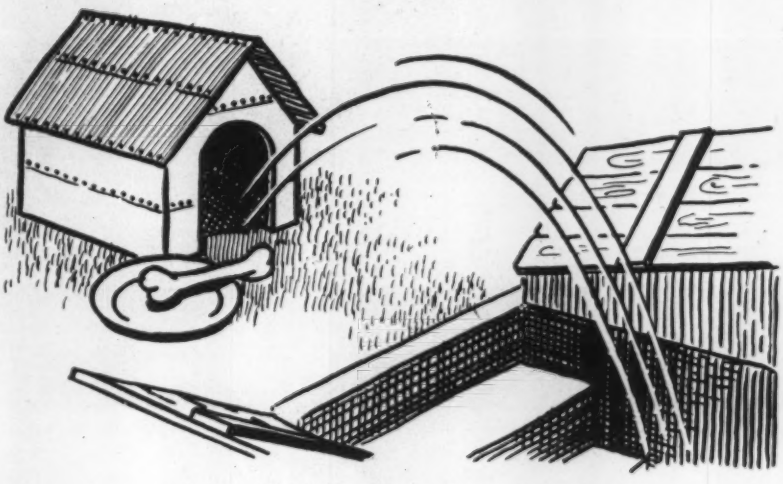
It is of wide application in freezing and heating units. Because of the copper in Rosslyn, swift heat and cold transfer is possible while the stainless steel surfaces, to which the copper is bonded permanently, provide hardness, resistance to corroion and ease of cleaning. Since most heat exchangers are tubular in construction, this new accomplishment can mean fuel economies because of the faster heat transfer rate of Rosslyn compared to other metals used for the same purpose.

Geneva Leases Coal Lands

Geneva Steel Co. has leased 2540 acres of coal lands in Carbon County, Utah, from the federal government, through the Bureau of Land Management.

Largest block of the leased acreage is a 2360-acre area from which Geneva is required to produce a minimum of 150,000 tons of coal per year and invest a minimum of $140,000 by the end of the sixth lease year.

Investigation Testimony Like Talking to the Wall



Fair Deal Trip Ticket: Dog house to cellar

BENJAMIN F. FAIRLESS says he is moving from "O'Mahoney's dog house to Emanuel's Cellar."

In a speech in Baltimore the U. S. Steel Corp. president echoed charges also made by Republic Steel Corp. President C. M. White that Congressional committees such as the O'Mahoney and Celler groups are trying and judging the nation's big steel companies "by innuendo."

R.S.V.P.—"Nowadays," says Mr. Fairless, "the chairman sends you a letter 'inviting' you to appear before his committee on a certain date. Then he starts issuing a barrage of statements to the newspapers telling the world what a nefarious character you are. When you no longer have a friend left, the hearing begins, and the chairman starts out by reading a statement in which he finds you guilty and pronounces sentence upon you. Then he announces that the committee will proceed to a full and 'impartial' investigation of the facts. When the evidence has been fully presented, the chairman ignores it completely, writes a report setting forth all of his preconceived notions, and quotes from his opening statement to prove he was right all the time."

Mr. Fairless says, "I have been through so many congressional inquisitions that no self-respecting skeleton would hide in my closet. I don't suppose there is a single statistic about U. S. Steel which could possibly be of any real interest or significance to anyone that is not already a matter of public record." Despite this, he charges, "our inquisitors remain blissfully ignorant of the most important fact of all—how steel is made."

Empty House—In a letter to Chairman Emanuel Celler of the House Judiciary Subcommittee on the Study of Monopoly Power, Mr. White scores the discourtesy that forced him to read his testimony to a row of empty seats two hours and a quarter after the time he was supposed to give his evidence.

"Instead of permitting me to appear as scheduled," he writes, "you called as a witness before me an iron ore broker from Georgia who rambled on for an hour and a quarter.

"Instead of being called at 9 a.m. as I was told I would be, it was 11:15 when I was called to present a carefully prepared statement. One by one the members of your committee were forced to leave the hearing until you and your counsel alone heard the statement which I had been asked specifically to prepare for the committee as a whole."

Celler Probe a Dud?

Majority of committee reluctant to go along with chairman. He may become more temperate

CHAIRMAN Emanuel Celler of the Monopoly Subcommittee investigating the steel industry has a dud. He must write a more temperate report than he wanted because he can't get a majority of his members to go along with him. Hearings are almost over; few remaining witnesses will be heard May 1 and perhaps May 2.

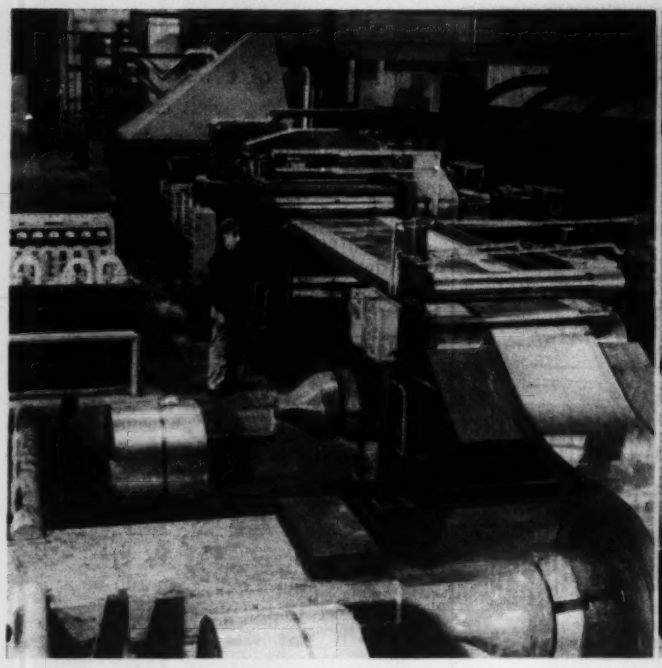
Mr. Celler wants an amendment to the antitrust law that would commit the government to break up all large corporations possessing, in his words, "too great economic power for the public welfare." U. S. Steel Corp., in Mr. Celler's belief, should be among the first to be dismembered.

He'll Eat His Words—Because a committee chairman never issues a minority report, Mr. Celler must tone down his recommendations to muster a majority. Of the ten-man subcommittee, only two Democrats appear likely to go all the way with Mr. Celler—Thomas J. Lane (Mass.) and Winfield K. Denton (Ind). The position of Democrat Edwin E. Willis (La.) is not revealed. Lined up against much of the Celler ideology are three Democrats—Joseph R. Bryson (S. C.), J. Frank Wilson (Tex.) and Francis E. Walter (Pa.).—and the three Republicans—Earl C. Michener (Mich.), Kenneth B. Keating (N. Y.), William M. McCulloch (O.).

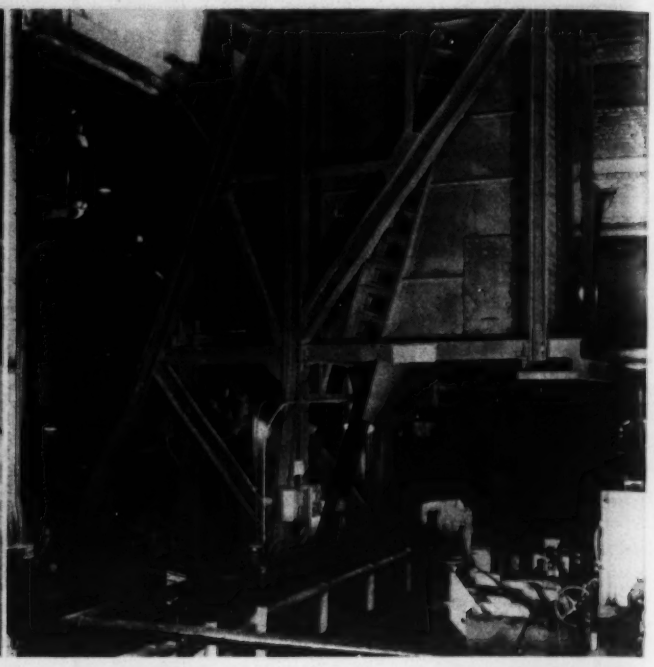
That the party line doesn't hold was illustrated when Democrat Wilson complimented U. S. Steel President Benjamin F. Fairless for "a mighty fair statement." Both Mr. Michener and Mr. Keating several times interrupted the hearings to complain of bias "to make political targets out of big business." Mr. Michener said "there are ideological differences between members of this subcommittee and even more markedly between members of the staff. What I want to know is are we conducting an investigation or are we trying to prove a case. If so, what case are we trying to prove? And I want to know who selected the witnesses, and whether they were selected on the basis of their willingness to tell the 'right' kind of a story." Mr. Celler said witnesses were selected from "both sides."

Not Interested—A big disappointment to Chairman Celler was the failure of the hearings to get much attention from the newspapers and radio broadcasters. Tactics to whet newspaper interest didn't work.

One such move was the promise



CONTINUOUS GALVANIZING: A workman checks the feeder rolls of the new 600-foot galvanizing line at the Gary sheet and tin mill of Carnegie-Illinois Steel Corp. Producing much brighter finishes, the new line has a production capacity of 60,000 tons a year



After being heated in an electric furnace, cold-rolled steel is dipped into a bath of molten zinc. Here a workman is stirring the zinc bath. The new line makes it possible to galvanize the steel continuously at a 300-feet-per-minute clip in widths up to 48 inches

to reveal "conclusive proof" that the three largest U. S. Steel companies were in a "Nazi plot before the war to limit world steel production." The "proof" was charges by James S. Martin, exchief of decartelization, American Military Government.

The Martin testimony "concerns the prewar relationship between the Steel Export Association of America and certain so-called international steel cartels," says Mr. Fairless. "This association was organized by certain American steel companies in April, 1928, under provisions of an act of Congress, the Webb-Pomerene Act. The export subsidiary of U. S. Steel was a member of this association, as well as a number of other American steel companies. There has been no move to revive this association. U. S. Steel is not now a party to any international steel agreement."

March Pig Iron Output Up

March pig iron production rose a little from the February level, but it was still more than a million tons below the March, 1949, figure.

American Iron & Steel Institute says producers in March, 1950, operated at 75.7 per cent of capacity to make 4,601,041 tons of pig iron, compared with 4,172,983 tons in February and 5,820,161 tons in March, 1949. Thus far this year 14,067,620 tons have been produced; first quarter production last year was 16,778,143 tons.

Coal Not So Sick

Lots of problems face industry, but leaders ask only favorable climate in which to work

COAL mining executives are finding no panaceas for the serious problems confronting them, but they don't like to be called a "sick industry." This was the consensus of 2000 delegates to the 1950 coal convention of the American Mining Congress in Cincinnati Apr. 24-26.

Major problems, as the coal people see them, are prolonged and frequent shutdowns by strikes, inroads on coal consumption by other fuels and the importation of foreign oil.

Not Too Bad — But an industry which is producing a tremendous volume of fuel and which is paying the highest industrial wages in the world, producing three to six times as much coal per man per day as any other country and which is spending hundreds of millions in modernizing its equipment cannot be classed as a "sick industry." That was what Secretary Julian D. Conover told the convention.

He asked for freedom from government investigations and control, fair tax treatment with adequate allowances for depletion and development, and application of antitrust laws to labor union monopolies.

Need Favorable Climate—"The coal industry asks only a favorable climate in which to work out its own destiny. We know the going may be tough—but we faced tough problems before."

Prediction that the "continuous miners" will be the answer to the economic problem of the coal industry which has resulted from higher wages and short productive days came from William C. Hess, general superintendent, Vesta-Shannopin Division, Jones & Laughlin, California, Pa.

Can Lower Costs — Gerald von Stroh, director of the mining development committee, Bituminous Coal Research Inc., Huntington, W. Va., forecast cost reductions of $1 to $1.50 a ton, within the next 10 years if developments in continuous mining maintain their recent rates.

Although total tonnage of coal produced in the United States during 1949 was 31 per cent less than in the record year of 1947, the percentage of mechanically loaded coal showed an increase of 4.6 per cent, and of 6.6 per cent based on deep mined coal, according to P. R. Paulick, consulting engineer, Library, Pa.

New England Makes Steel Survey

New England Council's steel committee has accepted Connecticut Governor Chester Bowles' offer of $60,000 from state funds to finance studies concerning the possible establishment of an integrated steel mill in the New London, Conn., area.

Castings: Where Do They Go?

Fabricating plants making machinery, except electrical machinery, are the best foundry customers. They take heaviest percentages of iron, copper and aluminum castings

WHICH industries or industrial classifications take the biggest volume of iron castings? Or are you interested in castings made of steel, copper and its alloys or aluminum and its alloys?

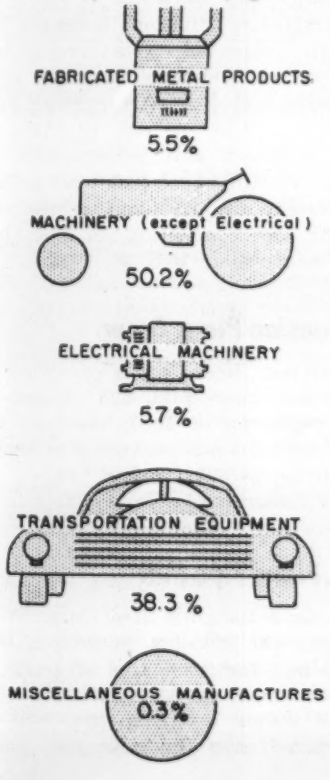
Consumption data on castings is listed in the Census of Manufactures pamphlet entitled "Consumption of Metal Mill Shapes and Forms and Castings by Individual Manufacturing Industries." Data on steel, copper and aluminum products appeared in STEEL, Apr. 10, pp. 56-57.

Data in the report cover only purchases by metal fabricating plants; they exclude castings produced and consumed in the same establishment. Also excluded is the consumption of iron castings by the steel industry in the form of ingot molds and stools and iron rolls.

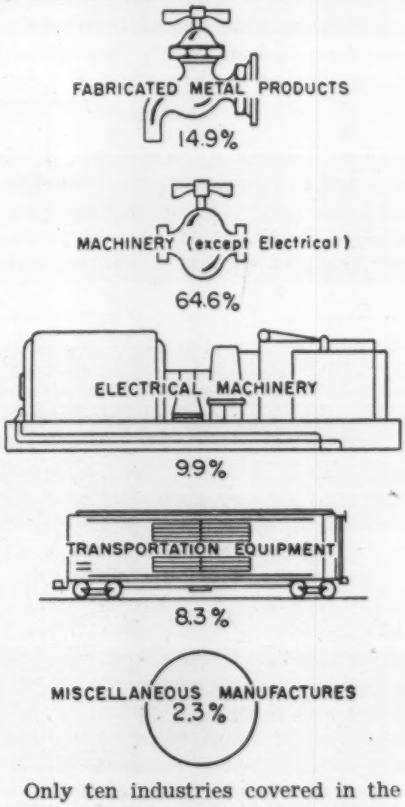
Top Consumer—The industrial classification ranking as top consumer of iron castings is machinery except electrical which used 2,128,615 tons in 1947 for 50.2 per cent of the total. Transportation equipment took second place with 1,621,591 tons or 38.3 per cent. Consumption by the three remaining classifications and percentages of total were: Electrical machinery, 240,305 tons, 5.7 per cent; fabricated metal products, 232,566 tons, 5.5 per cent; and miscellaneous manufactures, 13,935 tons, 0.3 per cent.

Fabricating industries covered in this report consumed 4,237,868 tons of iron castings. Home consumption, the construction industry and the steel industry accounted for the remainder of the 12,541,000 tons produced by the gray iron foundries and the 895,100 tons produced by malleable foundries in 1947.

Machinery
. . . tops iron castings list



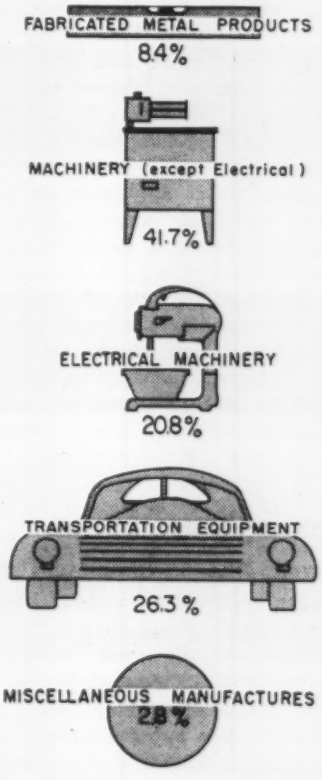
Census of Manufactures
. . . breakdown on copper castings



Only ten industries covered in the Census report took more than 100,000 tons of iron castings. These ten industries accounted for 72.4 per cent of all iron castings used. Motor vehicles and parts topped the list with 1,459,485 tons or 34.4 per cent of the total. Next biggest consumer was tractors (listed under machinery except electrical classification) with 365,494 tons or 8.6 per cent.

Still Out Front—In steel as in iron castings machinery except electrical was the classification with the largest volume of consumption, and transportation equipment was next. These two classifications accounted for 470,506 tons or 59.3 per cent and 271,105 tons or 34.2 per cent, respectively. Electrical machinery took 21,023 tons for 2.8 per cent of the total, fabricated metal products added 20,543 tons for 2.7 per cent and miscellaneous manufactures used 7060 tons for the remaining 1 per cent.

Aluminum and Its Alloys
. . . follow castings patterns



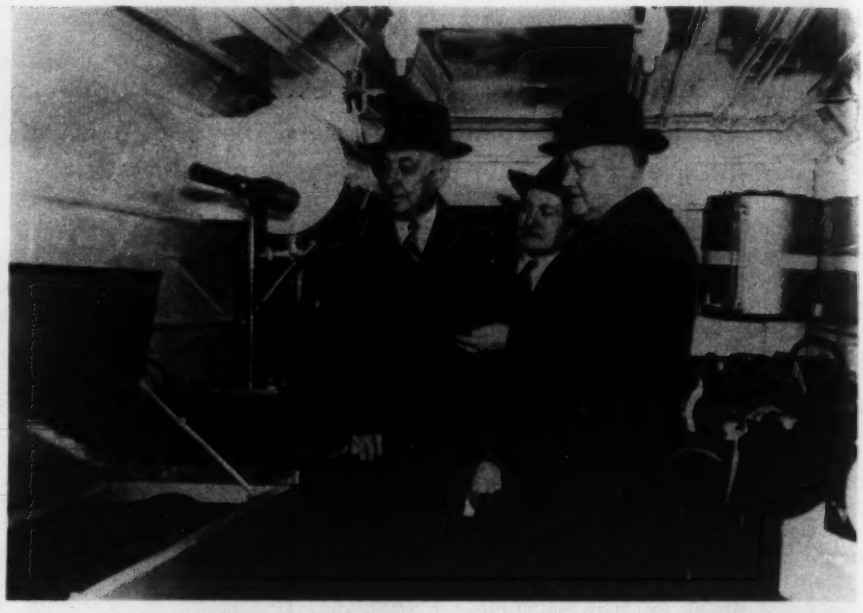
Nine groups consumed 20,000 tons or more of steel castings in 1947. Construction and mining machinery with 178,029 tons and railroad and street cars with 124,576 tons were the only two consuming industries at the six digit level. They accounted for 22.4 per cent and 15.7 per cent of the total, respectively. Other large steel castings users and percentages of the total consumed were: Motor vehicles and parts, 10.5; locomotives and parts, 6.3; tractors, 6.2; metalworking machinery 5.8; valves and fittings except plumbers, 3.4; oil field machinery and tools, 3.0; special industry machinery, 2.8.

Light Tonnage—Nonferrous castings tonnages consumed in 1947 were smaller than in either of the ferrous metals but machinery except electrical continued its domination as the biggest consuming classification. This category took 64.6 per cent of copper and copper-base alloy castings and 41.7 per cent of aluminum and aluminum-base alloy castings. Ton-

nages consumed were 66,600 tons and 44,980 tons.

Fabricated metal products with 15,299 tons or 14.9 per cent of the total is the classification listed as the second biggest consumer of copper and copper-base alloys. Electrical machinery, 10,180 tons, 9.9 per cent; transportation equipment, 8490 tons, 8.3 per cent; and miscellaneous manufactures, 2283 tons, 2.3 per cent, account for the remaining consumption by industrial classifications. Among individual industries only two used more than 10,000 tons of copper and copper base alloy castings. They were: Valves and fittings except plumbers', 21,245 tons, and pumps and compressors, 10,571 tons.

Second largest aluminum and aluminum-base alloy consuming industrial classification in 1947 was transportation equipment. It took 28,245 tons or 26.3 per cent of the total. Electrical machinery with 22,301 tons and 20.8 per cent of the total was third. Fabricated metal products used 8941 tons and miscellaneous manufactures 2945 tons. Their percentages were 8.4 and 2.8 per cent.



MOBILE AIR POLLUTION LABORATORY: An important instrument in Pennsylvania's new mobile air pollution laboratory is this MSA Electrostatic Sampler used in atmospheric sampling for dusts, fumes and smoke. It is being examined by: Pennsylvania's Health Department Secretary Dr. Norris W. Vaux, Industrial Hygiene Bureau Director Dr. Joseph Shilen and George H. Deike Sr., president of Mine Safety Appliances Co., Pittsburgh. The mobile laboratory is on tour at a time when the Air Pollution Conference is being held in Washington, May 3-5

Westinghouse Forum

Over 300 machine tool and press manufacturers attend 14th annual meeting

GOVERNMENT, by taking over research responsibilities in such projects as atomic energy, is inching in to an industrial sphere of technological development. Industry's right to do any important research may eventually be usurped if it is not prepared to spend the time and money on large projects.

So says Dr. C. C. Furnas, director of Cornell University's aeronautical laboratory. He spoke before Westinghouse Electric Corp.'s Machine Tool Electrification Forum held in Buffalo Apr. 25-26. More than 300 representatives from machine tool and press manufacturers attended this 14th annual meeting.

Horse and Buggy Gone—Dr. Furnas says industry has passed the stage where it can depend on old fashioned Yankee ingenuity to furnish the constant flow of new ideas needed to keep up the flow of new products. Product development now is a matter of money and patience. He believes that about a generation usually elapses between the birth of a new product in the research laboratory and its sale to the public. He does not foresee widespread industrial use of atomic power before 2000 A.D.

L. W. Scott Alter, president and general manager, American Tool Works Co., Cincinnati, described the economic history of the average production machine tool over 20 years. His study shows that a machine tool takes a sudden dive in resale value as soon as it goes into production work. This is followed by a short-term leveling off, followed by a steady decline to about 10 per cent of the machine's purchase cost over a period of about 10 years. From that time on it declines slowly in value until the junk man takes over.

Voices in the Matter—Other speakers included E. K. Morgan, engineer, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., on effect of carbide tooling on motor drive requirements; Ralph Shuman, electrical engineer, Warner & Swasey Co., Cleveland, on automatic electrical cycling and programming as applied to a new single spindle automatic chucking machine; and J. M. Morgan Jr., electrical engineer, Cincinnati Milling Machine Co., on practical examples of electronic devices as components of machine tool control.

Advances in techniques of attaining constant surface cutting speed in machine tools working on varying diameters were described by R. C. Montanus, vice president, Springfield Machine Tool Co., Springfield, O., and by E. B. Ankenman of Westinghouse.

Mr. Montanus' paper dealt particularly with attainment of constant surface speed in contouring lathes using single point carbide tools—the system involving combination of hydraulic and electrical apparatus.

At the concluding session, new additions to the Westinghouse line were presented to the group, including the new Life-Line DC motor and additional sizes of starters.

Sharp Snap Back—L. R. Ludwig, Westinghouse division manager at Buffalo, reported business has snapped back sharply from the mild recession last year with current production now at the rate of $70 million annually and employment at 6300. Westinghouse took over a Curtis-Wright aircraft plant at the end of the war, completing its first electric motor there Feb. 26, 1946.

Expansion Plans Grow

National Steel Corp.'s construction program, figured at $25 million at the beginning of 1950, has been advanced to $30 million, "many be expected to top $40 by yearend." says T. E. Weir, chairman.

J&L Plans Pipe Mill

Jones & Laughlin Steel Corp., Pittsburgh, will install a continuous butt weld mill for production of small diameter pipe at Aliquippa, Pa. Tin plate output at Aliquippa will be increased over the next two years.

Warehouse Share Drops

Distributors handling smaller percentage of steel. Warned trend may continue

"SLIDES ahead—Beware!" That was the danger signal hoisted for steel warehousemen by Walter S. Doxsey, president of the American Steel Warehouse Association, at the group's meeting in the Shamrock, Houston, Apr. 27-28.

A hint of things to come, says Mr. Doxsey, is that shipments of industrial steel products to warehouses in 1949 were 14.6 per cent less than the 1948 peak. Ingot production in 1949 was 13 per cent below 1948. Warehouses' dollar volume was off 21 per cent last year from 1948.

Look Out—"I think you may have enjoyed an artificial demand to a greater extent than you realize," he says, "and I warn against any false sense of security about the volume of warehouse business in the future. Warehouse distributors have received a material volume of marginal business as a result of scarcities during the past two years."

Warehouses had a prewar turnover of 1½ times per year, says L. S. Hamaker, assistant general manager of sales for Republic Steel Corp., who also spoke. "Many industrial warehouse organizations are now turning their inventory six times a year. It would be my conclusion that while 1½ times is too slow, six times is too fast to perform a true warehouse function."

No Drop, No Easing — About 600 new steel warehousing organizations have been established since the war, Mr. Hamaker points out. War Production Board certified 1400 warehouses during the war, so the increase in this field is about 40 per cent. "Competition in the warehouse business has been intensified to a marked degree," he believes.

Republic watches warehousing developments closely, he says, because the percentage of its tonnage going to warehouses is larger than for the steel industry as a whole. For the short term Mr. Hamaker sees "nothing to indicate an early possibility of a drop in steel operations or any easing in the tight situation in flat-rolled products."

Human Element in Cost Cutting

Achieving cost reduction is a day-to-day job in which the human equation is often the determining factor, John H. Vohr, general superintendent, Gary Works, Carnegie-Illinois Steel Corp., told members of the Society for the Advancement of Management in Chicago last week.

"No system and no report in itself is going to produce low costs," he says. "Regardless of systems, the worker, from management down to maintenance, is the human equation that tips the scales."

Labor Relations To Be Studied

Packing into a one-day program aimed at presenting the noteworthy trends and developments in human relations, the Industrial Relations Association of Wisconsin will hold a mid-century conference May 6 at the Elk's Club in Milwaukee.

Included will be a talk by Fred Hartley Jr., former representative from New Jersey, who will discuss "Truths About the Labor-Management Relations Act and Its Current Aspects."

GE's More Power 'Special' Will Visit 150 Key Cities

THE BIGGEST display kit ever built—the More Power to America Special—was unveiled in New York last week.

Almost a quarter-mile long, the train is the first attempt to display in one series of related exhibits the complete range of products for the production, distribution and industrial utilization of electric power. The silver streamliner, in New York on the first lap of a nation-wide tour, is powered by a 4500-hp, two unit Alco-GE diesel-electric locomotive—itself one of the exhibits. Eight cars in the ten-car train are filled with up-to-the-minute electrical products, systems and techniques for producing and utilizing electric power.

Ticket of Admission—When it stops at each of the 150 key industrial centers in the next year and a half, it will be inspected by invited representatives of electric utilities, the manufacturing and transportation industries, the armed services, the federal government and municipalities.

GE spokesmen say the train will not be open to the general public. Exhibits in the "special" are grouped in eleven major sections: Power Generation, Transmission and Distribution; Drives and Controls, Materials Handling, Welding, Industrial Heating, Renewal Parts, Industrial Lighting, Components for Industry, Measurements, Civic Improvement, and National Security.

MANY OPERATING EXHIBITS
. . . "spotting" a dummy load

Brilliant Array—Arrayed throughout the train are displays covering the complete range of apparatus for industry. Individual exhibits—many of them operating—cover such equipment as turbines, sub-stations, transmission equipment, motors of all sizes and ratings, complex drive systems, industrial and street lighting fixtures, precise instruments, welding and heating equipment, diesel-electric switchers, controls, urban transit and railroad equipment.

Still others relate to atomic power, weather research, guided rockets, aircraft jet engines, ultrasonics, ship propulsion equipment, fire control systems, and "snow-making" techniques. The grand total of electric products, processes and techniques on board the train comes to 2000.

An operating exhibit appears in the accompanying photo. In it, C. H. Lang (left), vice president in charge of sales for GE's Apparatus Department and C. P. Fisher Jr., manager of the Apparatus Exhibit Train Division, "spot" a dummy load in the materials handling section.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

A super informational service will soon be keeping you informed on government procurement. Daily synopses will list purchases for major procurement centers

GROUNDWORK for a "super" informational service on government procurement has been laid by the Commerce Department.

Under the new setup a businessman who has access to a Commerce Department regional, district or co-operative field office can keep himself informed on just about all the bid openings of 55 major procurement centers of the Defense Department and 12 similar offices of the General Services Administration.

This is how the system will work: At the end of a day each Defense Department or GSA office will teletype or air mail to the Chicago regional office of the Commerce Department a list of purchases approved that day, indicating for each the material and quantity desired, the bid invitation number, and the date the bids are to be opened.

Public Pick-up—The Chicago regional office will make up a daily synopsis of the information, listing the bid invitations by issuing offices. It will distribute the synopsis by air mail to the 13 other Commerce regional offices, keeping on hand its own and those of the department's 28 district offices and its many "co-operative" offices for pick-up by the public.

At the same time a copy of each bid invitation listed in the synopsis will be forwarded by the issuing activity to each Commerce regional office for inspection there by any interested businessman who, if he wants it, can get a copy by requesting it himself at the issuing office.

Later the bid invitations of other government procurement agencies probably will be included in the daily synopsis. As they now stand, the synopses include only the major government purchasing since Defense and GSA are the biggest procurement agencies.

One Day's Grist—Synopses will interest you for they include many products of the metalworking industry. Here's a list of items that appeared in one synopsis on a typical day last week:

Steel beams, channels, plates, phosphor bronze, wire spring, cylinder and ram assemblies, steel air flasks, hydraulic pumps, drain pumps, bridle tensioner pump units, valves, variable air capacitors, transformers, sheet steel piling, harvester machinery repair parts, abrasive grit, aluminum alloy extrusions, steel bracket pieces for 20 mm. guns, springs for cannon, electrical instruments, hardware kits, vibration test machines, gasoline air heaters, magnesium sheets and extrusions, portable arc welders, valve refacing grinders, generators, magnetic powder, wire rope and guys, chromium plating tanks, various types of motor vehicles, wire screen cloth, etc. And that was only one day's grist.

Commerce's Small Business Division, which is conducting the new services, says that some businessmen think the service could be made more direct. They'd like to have the daily synopses mailed to them. The Small Business Division says such a service is not possible with present personnel. Small Business Division spokesmen say businessmen who are really interested in the service ought to be able to assign at least a messenger boy to the task of picking up the daily synopses, possibly at the same time he goes out for the mail. They feel that where a businessman is located in a town distant from the nearest Commerce field office it should be possible to get somebody —possibly a high school student—to pick up the synopses for a small weekly fee and mail them in addressed, stamped envelopes.

TV Reconnaissance Possible

Television will have priority status in another war because of its many new military uses.

The Navy's Bureau of Ships—investigating and developing it for use in all the services—reports it has wide application in aerial reconnaissance, underwater salvage operations, various types of research, engineering, pilotless aircraft, and personnel training. At a press conference, the bureau showed the first movies ever made of a color television broadcast, the first movies of a television broadcast from under water, and the first color-sound motion picture ever made of a color broadcast.

Tell that camera man to quit playing around

Chromium Output Up

The Bureau of Mines stepped up production of electrolytic chromium to 100 pounds per day at Boulder City, Nev., after it improved and simplified its process for producing the metal.

The bureau now is studying costs to determine the commercial possibilities of the process. The raw material used is ferrochromium. From it the chromium is taken by depositing it in thin layers on stainless steel sheets. The bureau hopes to be able soon to furnish test lots to all companies and individuals interested in experimenting with the material. It is expected to have potential value in production of resistance wire, stainless steels, wire for thermocouples, stellite and high-temperature alloys for use in jet engines and gas turbines for aviation propulsion.

Patent Policy Set-up Feared

Back in June, 1947, the government patent authorities put together a three-volume report on a proposed uniform government patent policy. Objections to it were long, loud and leaden. Industrialists didn't like the policy because it would have permitted government rights to inventions by contractors doing work for the government. In the policy report the Justice Department recognized the spending of government funds as the only criterion to be considered by the government in exercising rights to contractors' inventions.

Some business observers in Washington today are wondering if President Truman's executive order No. 10096 isn't a foot in the door for reintroduction of similarly objectionable features in the government's patent policy. They don't like two clauses in the order. (It sets forth the basic policy for all government agencies on inventions made by government employees and creates a gov-

ernment patents board to effectuate the policy.) One disturbing clause in it is the one that empowers the board to "suggest modifications or improvements where necessary." The other clause—one of a number defining the board's duties—states it is the duty of the board "to perform such other or further functions or duties as may from time to time be prescribed by the President or by statute."

Going in Deeper and Deeper

The amount the government is going into the hole in fiscal 1950 is about $6.7 billion.

That's the estimate of the Joint Committee on Internal Revenue Taxation, as disclosed by Chairman Walter F. George (Dem., Ga.). When President Truman submitted the budget in January, 1949, the administration saw ahead a deficit of $5533 million—unless taxes were raised. Says Senator George: If the spending rate fixed in the President's budget of January, 1950, is approved by Congress, the government will go into the red $7.3 billion in fiscal 1951.

More Slum Clearance Projects

Fourteen additional communities requested and received capital grant reservations for slum clearance and urban redevelopment projects to be initiated by July 1, 1951.

Largest, says the Housing and Home Finance Agency, are for $5 million for the Urban Redevelopment Authority of Pittsburgh and $2,206,470 for the Housing Authority of the City of Houston, Texas.

Smaller projects are scheduled at Chicopee, Mass.; Orlando, Fla.; Paterson, N. J.; Troy, N. Y.; Asbury Park, N. J.; Portsmouth, Va.; Mayaguez, Puerto Rico; Harrison, N. J.; Sacramento, Calif.; and St. Croix, St. Thomas, and St. John in the Virgin Islands.

Final contracts will be signed when specific, approved plans have been prepared. The purpose of the capital grant funds is to absorb up to two-thirds of the difference between the cost of acquisition and preparation of slum and blighted area tracts and their fair price resale value at current appraisals. Local communities must absorb a minimum of one-third of the difference.

Industrialists Attend Conference

Industrialists who attended a joint "Civilian Orientation Conference" in the Pentagon, Washington, Apr. 17 and 18—featured by speeches on defense problems, on the place of industry in military planning and on the need for sustained research and development work—were: Lawrence D. Bell, president, Bell Aircraft Corp., Buffalo; Stewart P. Coleman, director, Standard Oil Co. of New Jersey, New York; C. Stewart Comeaux, secretary-treasurer, Sporting Arms and Ammunition Manufacturers Institute, New York; R. M. Eaves, assistant to president, International Harvester Co., Washington; A. W. Herrington, chairman, Marmon-Herrington Co. Inc., Indianapolis; Edward F. Johnson, general counsel, Standard Oil Co. of New Jersey, New York; Thomas A. Knowles, vice president and general manager, Goodyear Aircraft Corp., Akron, O.; Lauren D. Lyman, vice president, United Aircraft Corp., East Hartford, Conn.; John C. Markey, president, Aro Equipment Corp., Bryan, O.; J. Howard Marshall, president, Ashland Oil & Refining Co., Ashland, Ky.; Admiral DeWitt C. Ramsey, U. S. N., Ret., president, Aircraft Industries Association of America Inc., Washington; James Slayter, vice president, Owens-Corning-Fiberglas Corp., Newark, O.; Merle J. Trees, chairman, Chicago Bridge & Iron Co., Chicago; George Unbreit, executive vice president, the Maytag Co., Newton, Ia.; John B. Watson, Goodyear Rubber Co., San Francisco; J. Louis Reynolds, vice president in charge of operations, Reynolds Metals Co., Richmond, Va.

Three Division Chiefs Named

Three new division engineers were named to fill vacancies in the Army Corps of Engineers' decentralized field organization.

Col. F. F. Frech, effective June 10, will become Division Engineer at New York in charge of the North Atlantic Division, embracing New Jersey and Delaware and parts of Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, West Virginia, Virginia and North Carolina.

Col. Arthur W. Pence, June 1, will become district engineer at Cincinnati, in charge of the Ohio River Division, embracing parts of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, New York, Maryland, West Virginia, Virginia, North Carolina, Tennessee, Mississippi, Alabama, and Georgia.

Col. John S. Seybold on May 8 will become division engineer, South Pacific Division at Oakland, Calif., embracing California and Arizona, and parts of Oregon, Idaho, Nevada, Utah, Wyoming, Colorado and New Mexico.

Seven More 'Poor' Areas Listed

Seven more areas were classified by the Labor Department's Bureau of Employment Security as having unemployment of 12 per cent or more: Toledo, O., Cairo, Ill., Huntington, W. Va., Bennington, Vt., Atlantic City, N. J., the Upper Peninsula iron ore area and the Upper Peninsula lumber area, both in Michigan. Three areas have been removed from the list: New Britain, Conn., Fitchburg, Mass., and Silver City, N. Mex.

Know-How Search Ups Sales

Business for American manufacturers gets a boost when foreign technicians come here to study our know-how, says the Bureau of Reclamation.

Equipment contracts so far placed by some 200 engineers who came to the United States under the Point Four Program in 1949—as representatives of 36 countries interested in our methods of conserving water resources—have come to nearly $1.6 million—largely from India, Israel, Australia, and Chile. Much additional business is pending.

February Personal Income Rises

Personal income in February—including the special insurance dividend payments to veterans—was at an annual rate of $219.1 billion, $1 billion higher than in January, Commerce Department's Office of Business Economics says.

A substantial increase in dividend payments to veterans from the National Service Life Insurance fund was counterbalanced by the wage loss resulting from labor disputes and by a sharp drop in agricultural income.

OBE attributes the net $1 billion rise to expanded pay rolls in industries not affected by labor trouble.

Total wage and salary receipts in February, at an annual rate of $133.5 billion, were about the same as in January, despite wage losses from coal and auto strikes.

Mace in His Own Business

A. W. Mace, who retired in 1948 as assistant to the president of Allegheny Ludlum Steel Corp. in charge of the company's Washington office, is open for business as a consultant specializing in ferrous and nonferrous metals and their alloys and their applications to commercial, industrial and military needs. His office is at 3701 Sixteenth St. N. W., Washington.

In the last few years Mr. Mace served the government in consulting capacities. He was with the Office Of Industry Cooperation, the Munitions Board and the Air Force.

Business Outlook Good for Sterling Bloc

U. K. expects its gross national product to rise in 1950. South Africa, Egypt, India and Australia all are optimistic. Canadian prospects also are good

BUSINESS prospects are good for nations of the British Commonwealth and the sterling bloc.

The United Kingdom expects its gross national product to increase 2½ per cent in 1950 over 1949 to £ 13,155 million ($36.8 billion). Last year's gross national product of £ 12,834 million ($35.9 billion) was 4 per cent above the 1948 level.

The high level of industrial activity in Canada parallels the fast pace in the United States. Dominion steel production thus far this year exceeds last year's rate.

American firms—Link-Belt Co. is one—are participating in economic development of the Union of South Africa.

A five-year economic plan and program of public works give impetus to business optimism in Egypt.

India will produce 1,120,000 tons of steel in 1950, compared with 1 million tons in 1949. The steel shortage continues, but it is no longer as acute as immediately after the war.

The chronic steel shortage in Australia may be relieved this year by imports from Europe which for the first time since the end of the war is ready to ship ample tonnages abroad. Steel may be the sesame to open new economic vistas for the land down under.

U.K. Fair To Aid Economy

The British Industries Fair to run May 8-19 in London and Birmingham is another of Britain's attempts to keep up its economic momentum.

Nearly 140,000 British and foreign buyers are expected to see the latest products of 3000 exhibitors from 90 U. K. industries. Included at the fair will be developments in mining, road building, farm, materials handling, electrical, heating, steel mill and printing equipment, toys, sporting goods, office machinery and scientific instruments.

U. K. steel production for March reached a record annual rate of over 19 million ingot tons. The industry turned out nearly 4.7 million tons of steel in the first quarter, 231,000 tons above the first quarter of last year.

Major steel consumer continues to be the auto industry. Production is expected to rise 25 per cent in the next two years if the steel is available. Most of the increased output will be exported. Autoless Britons will have as difficult a time as ever buying a car. In January 30,747 cars and 10,267 trucks and busses were shipped abroad. That compares with 19,290 cars and 7,845 trucks and busses in January, 1949.

Standard Motor Co., Coventry, has received a $3 million order from Canada for 3000 Ferguson tractors. The contract enables Standard to boost its assemblies from 700 to 1000 a week. That rate is still a little below the high production reached at the end of 1948.

Foundries making castings for the auto industry are busy, but there is a lull in production of light castings for home construction.

Great Britain exported a record $516,040,000 worth of goods in March, 5 per cent more than in January when the previous record had been set. Imports of $619,640,000 in March were also the highest on record. March exports to the U. S. totaled $19.7 million; to Canada, $25.9 million.

U.S., Canada—Good Customers

Canada is spending 14 times as much in the U. S. as the U. S. is spending in Canada, on a per capita basis, says the Canadian Department of Trade & Commerce.

In 1949 the U. S. sold products to Canada valued at $1,951,860,065. The value of Canada's exports to the U. S. last year was $1,503,458,711. Canada's per capita purchases in the U. S. totaled $142; U. S. per capita purchases in Canada totaled $10. U.S. exports to Canada in 1949 increased $146,097,280 in value over 1948. Canada's exports to the U. S. in 1949 rose only $2,471,990 over 1948.

Principal exports from the U. S. to Canada in 1949 were iron and steel products; nonmetallic minerals; fibers, textiles and products; nonferrous metals and products; chemicals and allied products, in that order of importance. Nearly $800 million worth of iron and steel crossed the border from the U. S. to Canada last year.

Major Canadian exports to the U. S include wood products and paper, nonferrous metals and products and farm and animal products.

South Africa Needs Capital

The Union of South Africa has the raw materials for a great era of economic advance—but it doesn't have the money to finance the expansion.

Helping to solve the problem are American companies building subsidiary plants in South Africa. Link-Belt is one. Link-Belt Africa Ltd. has just been incorporated as a new subsidiary to build elevating, conveying, processing and power transmission devices, excavators and cranes. A plant will soon be constructed.

Canadian capital is also going into

Authenticated

PACKAGED HOMES: The Hawksley prefabricated home—a development of the four-unit type of construction—is suitable for export. It can be packed into convenient sized crates and boxes. Being turned out on assembly lines by the British, the homes are being shipped to countries where housing shortages are most acute. In this view, you see the kitchen side of the kitchen-bathroom unit being assembled on an independent conveyor line

African developments. Aluminum Ltd., Montreal, is helping to finance a hydroelectric program on the Volta river in the Gold Coast Colony, North Africa. Most of the power from the Volta plant, which will have an eventual capacity of 900,000 kw, will be used to produce aluminum from bauxite.

Egypt Orders Power Plant

A $5,337,000 order for a 45,000 kilowatt steam electric generating station to aid drainage and irrigation work along the Nile has been placed with Westinghouse Electric International Co.

The new power station, to be located at Talkha about 90 miles north of Cairo, will be the largest plant tying into an electrical network which supplies power to pumping stations in the delta region.

India Develops Industrial Area

International Bank for Reconstruction & Development has loaned $18.5 million to India for further development of the Damodar river valley, the country's most important industrial area. The loan will be used to finance part of the cost of the Bokaro-Konar project, which will include the largest steam electric plant in India. International Bank loans to India now total $62.5 million. The last loan will finance dollar payments in the U. S. and Canada for powerhouse construction and equipment.

The Government of India will loan $8.4 million to the Steel Corp. of Bengal and $3,360,000 to Indian Iron & Steel Co. Ltd., both of which are under the same management. The loans will enable the companies to boost output by about 200,000 tons.

The major steel expansion program in India, for which Arthur G. McKee & Co. is one of the consultants, has been approved, but construction work won't begin until finances permit.

Labor, Coal Curb Aussie Steel

Because of labor difficulties and a shortage of coal, Australia still is unable to match its prewar steel production rates.

Australian steel ingot production reached 1.2 million tons in 1949, compared with 1.3 million tons in 1938. The 1950 figure is not likely to exceed that for last year.

The increase in Australia's population and the prospect of more steel imports is booming the nation's metalworking industry. The home appliance industry is especially active. Few major appliances are not now manufactured in the dominion. A new refrigerator maker may enter the market soon—Pressed Steel Co. Ltd., the largest manufacturer in Europe.

The estimated average annual consumption of copper in Australia in 1950 will be 40,000 tons; 50,000 tons for 1951-1956; 60,000 tons from 1957 onwards. Average annual domestic production during these three periods will probably be 17,000 tons, 35,000 tons and 40,000 tons. The difference must be imported.

Dominican Ore

Reports by the Dominican Republic Minister of Economy of extensive magnetic deposits in that country capable of producing a million tons of high grade iron ore annually have left American steel producers rather cold. Some, who have studied the deposits, state definitely that they are not interested, that there isn't enough good ore for their purposes in large enough quantities for them to want to follow it up.

Foreign Steel Imports Gain

Imports of European steel, direct to West Coast ports, have been increasing and now amount to about 1 per cent of total Pacific Coast steel production. Prewar import volume was 2 per cent to 2½ per cent of the Western domestic output.

These products, both in the form of finished and unfinished steel, are being offered by brokers at prices 10 per cent to 20 per cent below listed quotations on domestic steel. Sales are being made to jobbers and fabricators, partly because of the price discount and partly because of the current scarcity of some of steel products. So far, in the current sellers' market, the imports have offered no competitive threat to West Coast producers.

Importers doubt if volume will increase sharply in the near future. A greater competitive threat, they say, could come when domestic supplies increase, and the price factor becomes more important.

Most of the imported steel comes from Belgium and Luxemburg. Some comes from Germany.

Imported items thus far have been mostly bars, strip, plates, nails, window sash and barbed wire. Considerable quantities of pig iron also have been landed at prices about $7 a ton under Geneva price. No sheets, the scarcest item on the West Coast, have been coming in.

Foreign Ore: Aid for South

Venezuelan iron ore may spur southern industry by boosting the area's steel output

VENEZUELAN iron ore may give a new impetus to Southern metalworking industry—when the raw material starts coming to this country in from three to five years.

U. S. Steel Corp. Chairman Irving Olds says the problem of the corporation's southern subsidiary, Tennessee Coal, Iron & Railroad Co., is not that of inducing new users of steel to locate nearby but to supply a terrific and continuing demand for virtually every product on its list.

The Right Blend—TCI may be able to meet that demand and more with the rich Venezuelan ore used in blends with local ores. TCI has already been experimenting with blends by mixing local and Brazilian ore.

The company has increased its blast furnace capacity by as much as 10 per cent because of the blending. Production expansions thus far have been accomplished without heavy capital expenditures.

TCI already has moved to obtain necessary dock facilities at Mobile, Ala., a major port that is one of the closest in the United States to Venezuela.

Much of the Venezuelan ore will move through the port to TCI's southern plants. A logical route for Venezuelan ore destined for Pittsburgh is also through Mobile and by rail or inland waterways to the Steel City.

Red Tape—Ruhr Style

BOTHERED by government red tape? Your problems may be nothing compared with those of German steel producers.

West German steel custodians working on the technical aspects of reorganizing the Ruhr industry have just sent a questionnaire to German steelmen that requires answers to about 1500 questions. Data needed includes production figures continuously from 1936, voltage and ampere strength of each motor in electric steel plants and the life expectation of each machine.

Each questionnaire must be filled out in 16 copies, ten in English and six in French. Most companies thus far have refused to fill it.

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Mirrors of Motordom

Continued large-scale buying of new automobiles puzzles industry's experts. Manufacturers can't build up dealers' stocks despite near record production

DETROIT

WHO's buying all the automobiles? That's a puzzler which has every experienced observer in the automotive industry a little stumped. If anyone had been so rash as to forecast three months ago that car and truck builders would be highballing to new production and sales records week after week in February, March and April, without an iota of assistance from the important divisions of Chrysler Corp., he would have been put away for observation among the squirrels. But here we are.

Recitation of all the various new sales records, terrific as they may be, is growing a little monotonous. Granted that the 35,000 weekly output of Chrysler plants has been doled out among the competition, it still takes a powerful imagination to conceive how the industry still could be pushing 140,000 units a week and beyond and at that not be extending dealers' stocks to any serious degree. This despite the worst spring weather in years over most sections of the country, plus streets and highways which are crumbling apart, parking problems defying all solution and traffic snarls of nightmarish proportions.

We're Still Loaded—Sure, there is an answer, probably a number of them. The most logical appears to be that major sections of the American public continue to be loaded with cash and ample credit they are willing to dish out for new cars. The cash comes from wartime earnings and profits still not consumed, veterans' bonuses and other government billions dumped into the economy, and a type of inflation which has flattened pocketbooks greater proportionately than it has pushed up the price of automobiles.

For the latter phenomenon manufacturers can take a good measure of credit, even though you still hear plenty of grumbling from many quarters over the high price tags on cars and trucks. Evidently this carping is not coming from the people who are laying it on the line at dealers' showrooms.

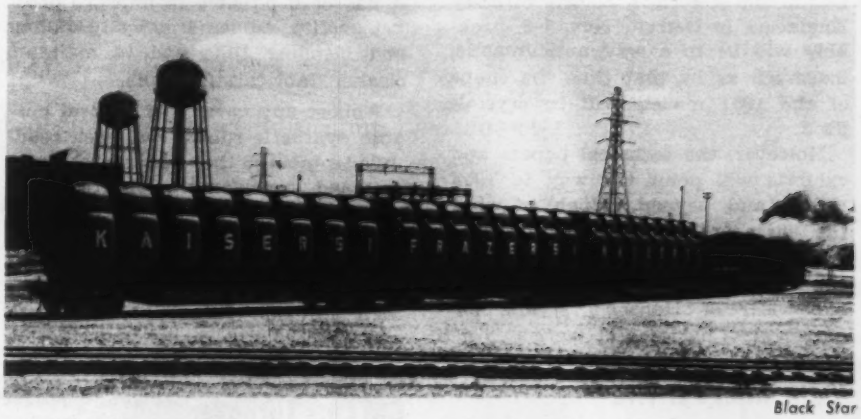
First-Half Record?—The first six months of this year seem sure to see assemblies topping anything yet dreamed of. Right now, including the U. S. and Canada, they are better than 2,000,000 and with eight weeks yet to go, plus the return of Chrysler certainly by next week, a half-year total of 3,700,000 is entirely possible.

For one thing when Chrysler does resume, the plan is to step up the assembly rate by nearly 20 per cent. That is, Chrysler divisions will be shooting for 8500 cars and trucks daily, in contrast to the 7100 level in force when the strike started Jan. 25.

Chrysler Buyers Busy—During the shutdown, Chrysler buyers and follow-up men have been chasing materials and parts furiously to match the advanced production rate, with a considerable degree of success. There are some suppliers, however, who expect to hear loud howls from Chrysler purchasing when production resumes because of insufficient parts banks. These pessimists say it is just going to be too bad because they are not going to shut off other automotive customers to divert material to Chrysler. At the same time, any company which has suffered a strike loss of 450,000 cars and trucks can be pardoned a little hand-wringing for special consideration from sources. There are hectic times ahead indeed on the matter of procurement.

Will Car Styles Change?

What about the car of tomorrow? Is it going to be the ornate, bulbous streamlined dream of the industrial designer, scratching his head over the drawing board and feeding photographs to the Sunday supplements? Putting aside the stress of the moment—Chrysler strikes, telephone strikes, railroad strikes and whatnot



Black Star

MEANS TO AN END: Above, a three-decker barge, loaded to capacity with Fords is pushed up the Mississippi river from Memphis to St. Louis. On board are 172 cars. In another arrangement of threes, special freight cars of Union Pacific are used to deliver completed bodies to the Kaiser-Frazer assembly plant in Long Beach, Calif. The unique pinwheel arrangement permits loading of 16 auto bodies per car—double conventional capacity

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—take a gander at what the car of 1951 or 1952 may be. Put all your money on the fact that this car of the future will not differ importantly from what's being driven today. Years ago General Motors called the pitch with the expression "evolution not revolution."

That is the primary direction to which all car manufacturers today have directed their engineering and styling efforts. The stylists, in their striving toward the low silhouette and roadhugging design, have had to sacrifice a measure of comfort and convenience. Chrysler picked up the ball and said it would not follow this trend, but would keep in mind tall guys and the high hats, designing their cars with the maximum of utility and comfort. This they did, but the result was not welcomed with any high degree of acclaim. True, the cars sold, but around Detroit it was common talk that Chrysler had missed the boat.

Chrysler Redesigning—Be that as it may, the word now is that Chrysler has a major retooling project in the works that will dwarf what was done to cars in the 1950 model series.

Just how far they will go in the direction mapped out by General Motors and Ford and some of the independents remains to be seen, the betting is that a long step will be made toward that concept. It will cost plenty of money. Chrysler spent something like $50 million for retooling the 1950 models and they were not particularly startling appearance-wise. For 1951 the tab may run far beyond that figure, and you may discover some real innovations emanating from the Chrysler engineering and styling experts.

The fifth annual technical convention of the American Society of Body Engineers in Detroit, Nov. 1-3, probably will be in a way anticlimactic, inasmuch as by that time the shape of the 1951 models will be crystallized.

However, the technical papers and exhibits will point the way to 1952 trends and beyond, which is what the engineers in this field are primarily concerned with. General chairman of the meeting will be the supervisor of Hudson's styling department, Charles V. Cheriez.

More Miles Per Tire

Tires on your car will give 1500 to 2000 miles more wear, because of new advances which have been made in the blending of "cold" rubber and chemicals. The process, known as masterbatching, now is being used to produce rubber for tire treads at the synthetic rubber plant operated by the United States Rubber Co. at Borger, Texas. The usual method of blending carbon black, a reinforcing agent, and rubber is to mix them dry in powerful masticating equipment. In the masterbatch process, the carbon black is blended in water with rubber in a latex form. The compound then is changed with salt and acid solutions to a dry rubber already containing the necessary amount of carbon black.

Natural rubber has been compounded almost exclusively by the dry-mix method. Synthetic rubber, however, is well suited to the masterbatching technique. By supplying rubber goods manufacturers with synthetic rubber and carbon black premixes, it has been possible to improve product quality, reduce drastically milling and blending time and to maintain cleaner fabricating plants.

Almost any variety of general purpose synthetic rubber has been readily adaptable to the masterbatch process and considerable progress has been made in masterbatch techniques. It was only recently, however, that it was possible to blend the newer types of carbon blacks known as high abrasion furnace blacks, with cold rubber.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	504,954	443,734
March	613,000*	543,711
April		569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
April 8	133,172	131,870
April 15	147,657	131,821
April 22	149,000	141,227
April 29	150,000	136,433

Estimates by Ward's Automotive Reports

* Preliminary.

GM Cuts Turnover

General Motors had 24,213 fewer employees who quit their jobs in 1949 than in the previous year, primarily because of a better employee attitude and the "greater energy, enthusiasm and thought which our people in the plants have directed toward this important subject of proper selection, placement and follow-up of employees." This statement came from George A. Jacoby, director of the personnel services section of GM's personnel staff, before 125 medical directors of GM plants in the United States and Canada, who held their 13th medical conference at the Electro-Motive Division, La Grange, Ill.

Mr. Jacoby said he felt that the improvement in turnover was even more noteworthy in the face of the fact that total employment was increased substantially during the last year.

He revealed that General Motors hired more than 130,000 new people in 1949 to take care of the increase in employment which GM made last year, and as replacements.

Nash-Kelvinator Sales Up

Sales and earnings of Nash-Kelvinator increased sharply in the quarter ended Mar. 31, following a decline in the preceding months as a result of a three-week shutdown of the Nash Division in November and a major curtailment of Kelvinator production, both due to the steel and coal strikes. Net earnings for the quarter were $7,214,398 or $1.66 per share compared with $4,215,849 or 97 cents per share in the preceding quarter and $7,136,524 or $1.64 per share in the like period a year ago.

Sales for the Mar. 31 quarter this year were $112,513,857 against $75,409,633 in the preceding quarter and $96,243,590 in the corresponding period last year. Net earnings for the six months ended Mar. 31 were $11,430,248 or $2.63 per share compared with $12,995,814 or $2.99 per share a year ago. Sales for the six months were $178,923,490 against $180,521,625.

Studebaker, too, Increased Sales

Studebaker sold 89,012 passenger cars and trucks in the first three months of this year. Last year the company sold 69,326 in the same period.

With its subsidiaries the company had a consolidated net income of $6,923,711 in this year's first quarter. Last year the figure was $5,207,800.

Studebaker's net sales in the first three months of 1950 were $122,372,883 versus $113,709,373 in the corresponding period of last year.

All of which seems to confirm the amount of money Americans are still willing to spend or go into hock for to get new cars.

No greasing of bearings in rear wheels of 6 makes of cars!

The self-sealed ball bearing is a New Departure creation which has been proved by 16 years and billions of miles in active service!

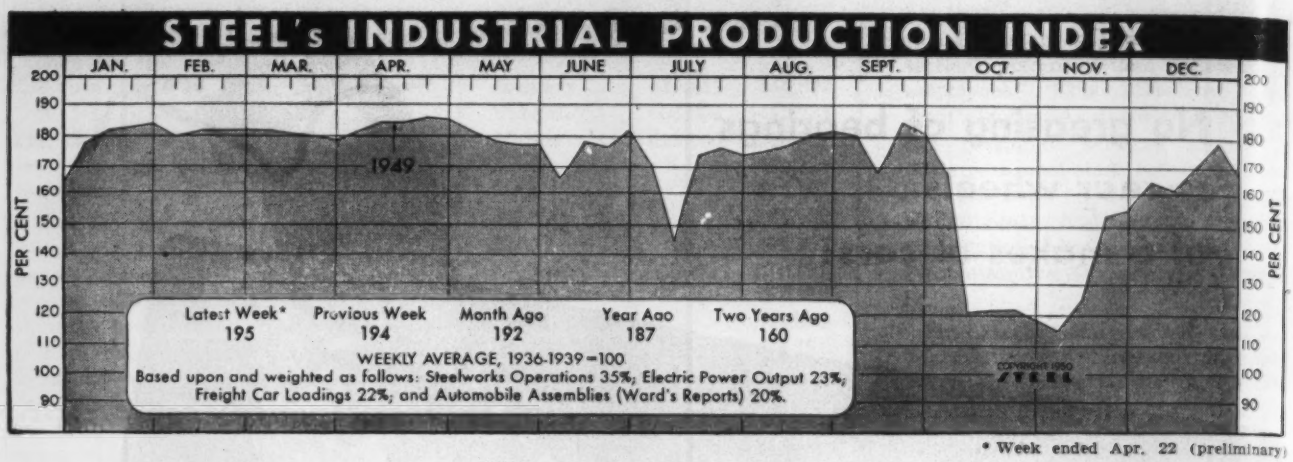
Proof against neglect or wrong lubrication. No dirt can get in, no grease can escape to cause slipping brakes. No bearing adjustment — ever!

Unsurpassed for dependability and freedom from service.

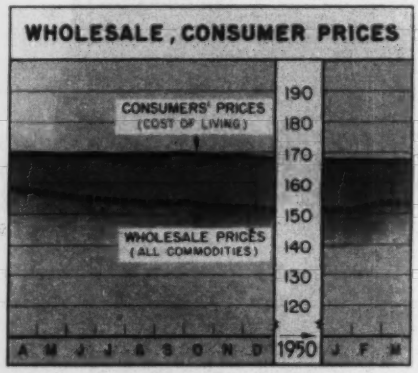
Nothing Rolls Like a Ball

NEW DEPARTURE BALL BEARINGS

NEW DEPARTURE • Division of GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT BRANCHES IN ALL PRINCIPAL CITIES


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1949
Latest Week* 195
Previous Week 194
Month Ago 192
Year Ago 187
Two Years Ago 160
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1950 STEEL

* Week ended Apr. 22 (preliminary)

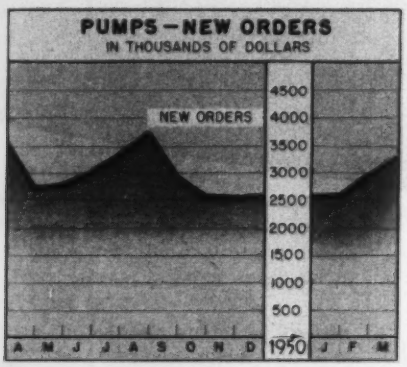


Charts—Copyright 1950, STEEL

Price Indexes

	Wholesale		Consumers	
	1950	1949	1950	1949
Jan.	151.6	160.5	166.9	170.9
Feb.	152.7	158.1	166.5	169.0
Mar.	152.6	158.4	167.0	169.5
Apr.	....	156.9	....	169.7
May	....	155.7	....	169.2
June	....	154.4	....	169.6
July	....	153.4	....	168.5
Aug.	....	153.0	....	168.8
Sept.	....	153.6	....	169.6
Oct.	....	152.2	....	168.5
Nov.	....	151.6	....	168.6
Dec.	....	151.3	....	167.5
Average	....	154.9	....	169.1

Bureau of Labor Statistics

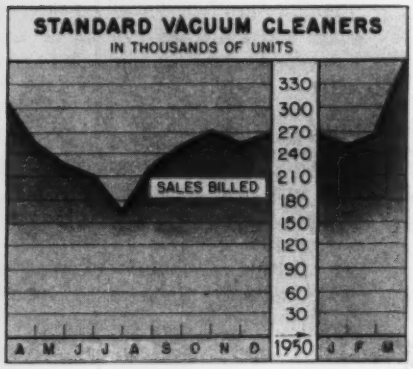


Pumps, New Orders

In Thousands of Dollars

	1950	1949	1948
Jan.	2,586	3,390	3,819
Feb.	2,938	3,247	3,635
Mar.	3,313	3,593	4,703
Apr.	....	2,699	4,312
May	....	2,775	3,724
June	....	3,019	3,512
July	....	3,358	4,075
Aug.	....	3,767	4,520
Sept.	....	2,914	3,474
Oct.	....	2,539	3,571
Nov.	....	2,525	3,580
Dec.	....	2,560	4,263
Totals	....	36,386	47,188

Hydraulic Institute



Standard Vacuum Cleaners

Sales Billed—Units

	1950	1949	1948
Jan.	249,150	228,769	304,273
Feb.	263,515	241,267	311,448
Mar.	361,014	309,897	355,415
Apr.	.....	252,656	306,588
May	.....	222,850	276,657
June	.....	207,354	256,071
July	.....	161,920	229,537
Aug.	.....	219,909	237,202
Sept.	.....	250,036	280,084
Oct.	.....	272,520	281,573
Nov.	.....	253,516	255,080
Dec.	.....	265,513	273,890
Total	.....	2,886,514	3,360,859

Vacuum Cleaner Manufacturers' Assoc.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation ..Apr.17	Furnaces, Indus. ..Apr.17	Radio, Television ..Mar.27
Employ., Steel Apr.17	Gear Sales Apr.3	Ranges, Gas Jan.2
Durable Goods Apr.24	Gray Iron Cast. ...Apr.24	Steel Castings Apr.24
Employ., Metalwkg Apr.24	Ind. Prod. Index...Apr.10	Steel Shipments ..Apr.24
Fab. Struc. Steel...Apr.10	Ironers, Standard ..Apr.17	Trucks, E.ec. Ind...Jan.2
Foundry Equip. ...Apr.17	Machine Tools Apr.24	Wages, Metalwkg...Mar.20
Freight Cars Apr.17	Price Indexes Apr.3	Washers Apr.10
Furnaces, W. Air...Jan.2	Purchasing Power..Apr.10	

Consumers' Prices Rise

Consumers' price index reversed its trend in the month ended Mar. 15 and advanced to 167 per cent of the 1935-1939 average. The latest figure released by the Bureau of Labor Statistics is 0.3 per cent higher than a month earlier. It is the highest point for the year to date but 1.5 per cent lower than in the same month a year ago.

Chiefly responsible for the increase in the index was the increase in food prices which went up 0.6 per cent in the period Feb. 15-Mar. 15. Food prices had declined for three consecutive months prior to this rise. Fuel, electricity and refrigeration rose 0.4 per cent in the last period and fractional increases were recorded for rents, apparel and house furnishings.

The bureau's comprehensive monthly wholesale price index declined 0.1 per cent in March to 152.6 per cent of the 1926 average from 152.7 in February. Average primary prices of foods and metals declined fractionally in March, all other groups advanced. The greatest increase was for chemicals and allied products which rose 1 per cent.

Vacuum Cleaner Sales Shoot Up

Standard-size vacuum cleaners factory sales shot up sharply in March, reports the Vacuum Cleaner Manufacturers' Association. Sales totaled 361,014, a 37 per cent increase over the 263,515 vacuum cleaners sold in the preceding month and up 16.5 per cent from factory sales of 309,897 units in March, 1949.

Industry's first quarter sales also were up. They totaled 873,679 vacuum cleaners, a 12 per cent gain over 780,240 units sold in the corresponding 1949 period.

March's sales volume is the best monthly total posted by the industry since December, 1947, when 373,254 cleaners were sold.

The Business Trend

Current indicators still pointing up but business leaders warn that backlogs won't last forever and there may be some easing in the second half

WHETHER it be the realization that the present business boom can't last forever or a tendency to guard against too much optimism, some of the nation's business leaders are beginning to remind the public about a possible business slowdown in the second half. They are not "viewing with alarm" or warning their listeners about a sharp drop but pointing to the economic signposts that show a need for slowing up eventually if not right now.

All the current indicators are still pointing up but it is a good idea to remember that at least part of the present day business activity is due to shortages caused by strikes. Although backlogs are large in many branches of metalworking, allout production is eating into some of them.

Industrial Production . . .

One of the economic indicators that is still upward bound is STEEL's industrial production index. In the week ended Apr. 22 it took another step into the stratosphere and reached a preliminary 195 per cent of the 1936-1939 average. This is the third time in the last four weeks that a new weekly output high for the index was set. Steelmaking and automobile assemblies are supplying the motive power for the rising index. Freight carloadings have leveled off and electric energy distribution is easing from its winter highs.

Automobiles . . .

Although it's hard to believe U. S. plants are far ahead of record 1949's assembly pace with one of the Big Three out of action for three months. Up to the week ended Apr. 22 outturn in U. S. plants totaled 1,683,000 cars and 374,000 trucks, compared with 1,393,511 cars and 414,595 trucks in the same period last year. Canadian plants added 79,000 passenger cars and 28,700 trucks in the same period. A year ago they had built 42,313 and 29,830. Not only are General Motors and Ford having a field day but the independents are pushing their assembly schedules up and adding overtime operations.

Power . . .

Electrical energy distributed continued its gradual descent in the week ended Apr. 22. Edison Electric Institute totals show 5846 million kwhr distributed that week. Although the latest figures represent the fifth consecutive weekly decline, they are 500 million kwhr higher than in the like period a year ago. The decline is seasonal in nature resulting from a lessening in heating and lighting requirements.

Bituminous Coal . . .

Another field where production is declining is in bituminous coal mining. This falling off in output cannot be taken complacently. The reduced operations mean coal is again piling up and a serious economic problem is a long way from solution. In the week ended Apr. 15 bituminous coal output was down to 11,330,000

BAROMETERS of BUSINESS

	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
Steel Ingot Output (per cent of capacity)†	100.0	98.0	96.0	99.0
Electric Power Distributed (million kilowatt hours)	5,846	5,863	5,993	5,326
Bituminous Coal Production (daily av.—1000 tons)	1,888	1,917	2,217	1,937
Petroleum Production (daily av.—1000 bbl.)	5,026	4,999	4,848	4,973
Construction Volume (ENR—Unit $1,000,000)	$185.7	$177.6	$177.3	$107.3
Automobile and Truck Output (Ward's—number units)	149,855	147,240	140,196	141,532

*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.

Freight Car Loadings (Unit—1000 cars)	704†	707	717	769
Business Failures (Dun & Bradstreet, number)	188	201	186	198
Money in Circulation (in millions of dollars)‡	$26,992	$27,072	$26,972	$27,400
Department Store Sales (changes from like wk. a yr. ago)‡	−19%	none	+1%	+7%

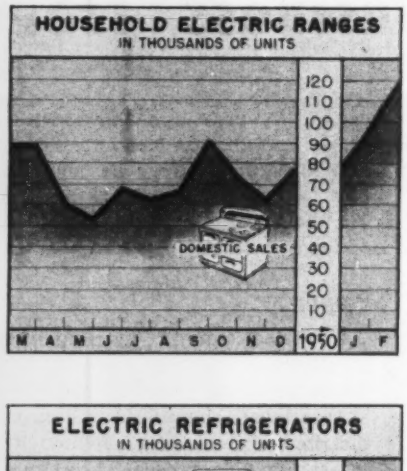
†Preliminary. ‡Federal Reserve Board.

Bank Clearings (Dun & Bradstreet—millions)	$15,082	$12,422	$15,827	$13,126
Federal Gross Debt (billions)	$255.6	$255.4	$255.9	$251.4
Bond Volume, NYSE (millions)	$18.7	$25.0	$22.8	$18.8
Stocks Sales, NYSE (thousands of shares)	15,331	12,683	9,306	5,228
Loans and Investments (billions)†	$66.6	$66.6	$66.9	$61.1
United States Gov't. Obligations Held (millions)†	$35,941	$35,920	$36,877	$32,767

†Member banks, Federal Reserve System.

STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	154.01
STEEL's Nonferrous Metal Composite‡	162.3	158.2	157.4	194.4
All Commodities†	152.2	152.1	151.7	156.6
Metals and Metal Products†	170.0	169.7	169.6	171.2

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.

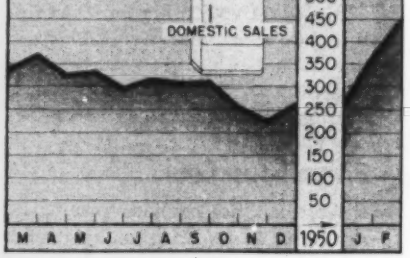


Household Electric Ranges

Domestic Sales—Units

	1950	1949	1948
Jan.	97,925	106,473	103,585
Feb.	118,989	87,370	103,506
Mar.	.....	87,543	127,461
Apr.	.....	59,894	104,677
May	.....	52,286	98,983
June	.....	68,107	123,300
July	.....	62,402	83,485
Aug.	.....	66,222	116,107
Sept.	.....	91,073	128,829
Oct.	.....	72,672	122,516
Nov.	.....	60,523	123,661
Dec.	.....	77,011	105,387
Total	.....	903,806	1,341,497

National Electrical Mfrs. Assoc.

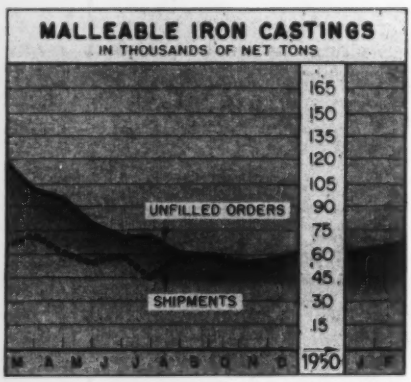


Electric Refrigerators

Domestic Sales—Units

	1950	1949	1948
Jan.	364,002	380,853	272,121
Feb.	450,751	337,424	281,580
Mar.	.....	369,216	338,109
Apr.	.....	324,370	330,720
May	.....	330,753	317,763
June	.....	296,199	373,115
July	.....	315,444	351,094
Aug.	.....	307,622	281,345
Sept.	.....	309,429	344,260
Oct.	.....	252,580	380,854
Nov.	.....	221,221	374,470
Dec.	.....	259,158	330,660

National Electrical Mfrs. Assoc.



Malleable Iron Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1950	1949	1950	1949
Jan.	62.9	71.9	62	126
Feb.	60.4	66.7	67	118
Mar.	...	72.1	..	102
Apr.	...	61.3	..	95
May	...	54.6	..	79
June	...	59.6	..	70
July	...	44.4	..	71
Aug.	...	58.1	..	61
Sept.	...	60.5	..	58
Oct.	...	57.2	..	54
Nov.	...	49.4	..	56
Dec.	...	57.4	..	61
Total	...	713.1		

*For sale. Bureau of the Census

Charts—Copyright 1950, STEEL

net tons, the fourth consecutive week of decline and about 2 million tons below immediate poststrike totals.

Business . . .

Business failures in March rose to 884, says Dun & Bradstreet Inc. This is the largest number of failures since May, 1942, and is 4 per cent higher than in March, 1949. Mining and manufacturing failures in March totaled 206 and had current liabilities of $31,074,000.

Construction . . .

Civil engineering construction volume in the week ended Apr. 20 totaled $185.7 million, 5 per cent above the preceding week and 73 per cent above the comparable week a year ago. Cumulative total for the first 16 weeks in 1950 is $3261 million, 41 per cent above the corresponding 1949 total. Private construction constitutes 58 per cent of all construction and totals $1889 million.

Railroads . . .

Association of American Railroads estimates that Class I railroads' operating revenues in March topped the year ago total by 1 per cent. The estimate is based on a 3.1 per cent rise in freight revenues and a 11.8 per cent drop in passenger revenues.

Sunshine on West Coast

Second quarter will be as good or better than year ago, say 81 per cent of manufacturers

CALIFORNIA manufacturers are optimistic and expect business to be at a high level in the second quarter. A survey by the California Manufacturers Association indicates 81 per cent expect their second quarter sales to equal or top the like 1949 period.

A similar poll last January covering first quarter prospects showed only 70 per cent expected the first quarter to be better than a year ago. Manufacturers employing 700,000 workers or 17 per cent of the state's work force were covered in the poll.

Bigger Payrolls Planned—Greater job stability is also indicated in the survey. Increased payrolls are planned by 33 per cent, 48 per cent expect payrolls to be relatively unchanged and only 19 per cent expect reductions in working forces.

Advertising and sales promotion will get increased emphasis from 36 per cent of the manufacturers. Only 12 per cent are reducing advertising and promotion expenditures. The remaining 52 per cent plan no change.

Deep in the Heart of Taxes—The manufacturers believe the principal deterrents to their business are taxes (31 per cent) and discriminatory freight rates (29 per cent). Other unfavorable factors cited are: Labor (23 per cent) and "cut-throat" competitive tactics (13 per cent).

Confirming the manufacturers' poll is a California State Chamber of Commerce report showing marked improvement in nearly all phases of the state's economy during March. Unemployment declined 7 per cent to 456,000 from 490,000 in February and was about 80,000 less than a year ago. Manufacturing industries showed substantial gains, both in seasonal and nonseasonal lines, and smaller gains were reported by service and wholesale trades. Home building activity and real estate turnover were unusually high.

Good Year Ahead

Discussing Westinghouse Electric Corp.'s prospects in the near future, Gwilym A. Price, president, says that this should be a good year for Westinghouse but may not be as good as 1949. For industry in general he says a number of factors contribute to continued good business for the long pull, especially when compared to any

year prior to 1947 and 1948. As one indication he calls attention to nationwide production of capital goods which is running at a rate more than double the 1935-1939 average.

Mr. Price also points out that consumer income and expenditures have shown unusual stability and that physical output of consumer durable goods is 80 per cent higher than the 1935-1939 average. With reference to his company's product lines, Mr. Price says consumer products are growing in importance to total business and "offer a bright outlook this year, and for the next few years as well."

First quarter earnings for Westinghouse were higher than in the like 1949 period but net sales were down slightly. Net income in the first 1950 period was up about $1 million to $11,890,377 but net sales billed were almost $3 million lower.

Camera Sales Still Strong

Although sales in the first quarter were down 6.5 per cent from those in the like period a year ago, T. J. Hargrave, president, Eastman Kodak Co., Rochester, N. Y., feels the company should end this year with sales as good as in 1949. Sales in the three month period ended Mar. 31 were $84 million, he says.

A year ago Eastman had a large backlog, Mr. Hargrave points out, and so results in the first period this year do not give a true picture of the trend in business. He is particularly optimistic about the growing use of photography in commercial and business applications and adds that television should greatly increase sales.

Eastman's budget for plant expansion this year is $33 million. This sum exceeds 1949 expenditures by $3 million.

Steelmaking Setting New Weekly Output Records

STEEL is pouring out of steelmaking furnaces at a 100 million ton annual rate. The last two weeks saw new weekly production marks entered into the steel industry's already imposing record book. Output last week topped 100 per cent of practical capacity and wiped out the week-old previous record.

Increase in capacity over 1949 makes it possible for the steel industry to set new weekly production marks even though operations are lower than a year ago percentagewise. Total weekly capacity this year is 1,906,268 net tons of steel for ingots and castings. Last year it was 1,843,516 tons.

Steelmaking's pace in April means a new record for the month estimated at 8,096,000 tons. Comparison with the same month in other years is shown in the chart. This performance is the best for the month in either wartime or peacetime and is 4 per cent higher than the preceding high for the month set a year ago. It is only the third time in history that more than 8 million tons of steel were produced in one month.

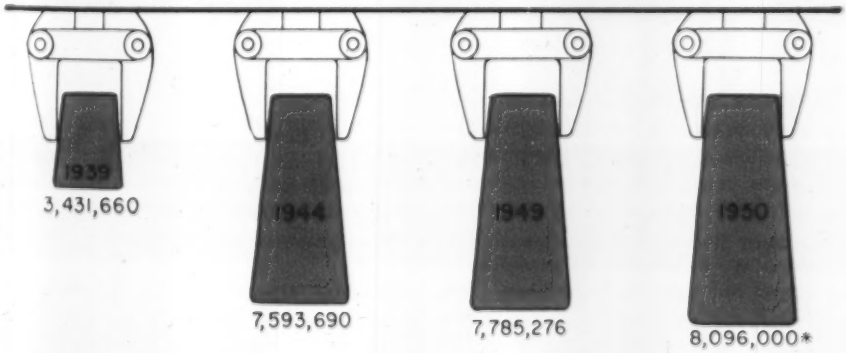
Just a Day Away — January and March, 1949, are the only two months with higher production totals. In March, 1949, steelmaking output reached 8,387,927 tons, the alltime monthly record. Both months had one more day to achieve their marks. An additional day's operations at the present level would put April very close to the alltime record.

Present indications are that the second quarter output will remain very close to practical capacity. There is no evidence of steel being stockpiled by metalworking companies except for Chrysler where the company continues to take steel and materials even though its plants have been strikebound.

Still Not Enough—Some companies, especially those without established mill sources, are not getting all the steel they need. Conversion deals are fairly common and rumors of gray market activity are circulated. There is no evidence that gray market operations have progressed beyond the rumor stage. Since it is usually the company which can least afford it that gets involved with gray marketers and since the memory of inventory losses sustained in such activity is still fresh, there will be no rush to get ensnarled again.

Best April Yet for Steel Output

. . . only day away from alltime high



All monthly totals are in net tons. * 1950 figure estimated.

Steel Incomes Stay Up

Early reports from steel companies indicate that first quarter net incomes will not be far behind those in the corresponding period a year ago. This showing is remarkably good in view of the slowdown in steelmaking operations in the first quarter as the result of the coal strike and the addition of substantial payments to pension and welfare funds. The decrease in sales is somewhat larger than the drop in net incomes, showing that expenditures for improving productive facilities are beginning to pay off. In almost all cases the ratio of net income to sales is improved over a year ago even though net income may be down.

The 13 companies whose first quarter net incomes are listed in the table below had an aggregate net income

	First Qtr. 1950 Net	First Qtr. 1949 Net	% Change
U. S. Steel	$49,217,742	$49 928,670	— 1.4
Republic	16,621,334	15 298,628	+ 8.6
Jones & Laughlin	5,309,828	9,868,895	— 46.2
Youngstown	7,490,941	10,022 660	— 25 3
National	13,434,454	14 753,775	— 8.9
Inland	9,320,463	9,254,230	+ 0.7
Armco	11,894,130	8,404,861	+ 41.5
Colorado Fuel & Iron	1,613,078	2,518,797	— 36.0
Granite City	1,201,879	821 018	+ 46.4
Allegheny Ludlum	2,270,681	1,542,195	+ 47.2
Continental	840,071	203,086	+313.7
Sharon	1,633,630	2,905,301	— 43.4
Rotary Electric	310,841	1,097,052	— 71.7

of $121,159,072 in the first quarter, off 3.5 per cent from the $126,619,168 net for the same companies in the first quarter 1949.

Bloom May Fade from Boom

A gradual decline in steel business sometime in the second half is expected by Irving S. Olds, chairman, U. S. Steel Corp. He foresees no sharp drop but believes conditions are becoming ripe for an easing within the next few months.

Mr. Olds points to the current high steel production rate and says it is going to have a telling effect on accumulated needs resulting from the steel and coal strikes. He anticipates a strong demand for the rest of this quarter, and a good year overall.

Men of Industry

LAWRENCE J. KLINE
. . . Automatic division sales manager

Lawrence J. Kline was appointed sales manager, automatic division, **Automatic Transportation Co.,** Chicago. Associated with the materials handling industry for 30 years, Mr. Kline joins Automatic after being connected with Mercury Mfg. Co., Chicago, where he was executive vice president.

Pittsburgh Screw & Bolt Corp., Pittsburgh, elected as vice presidents **Harry W. Schuetz, Gerald J. Garvey,** and **George E. Horney.** Mr. Schuetz has been assistant to the president and general manager of the Colona Division, and is now in charge of that division with office at the Monaca, Pa., plant. Mr. Garvey, now vice president in charge of the Gary Screw & Bolt Division, was for many years a member of that division's sales staff and in the last few years was general manager of the Gary operation. Mr. Horney, who formerly served as general manager, Gary Division, was more recently assistant to the president of the corporation, with offices in Pittsburgh. **Albert N. Williams** was elected to the board of directors. He is president and a director of Westinghouse Airbrake Co. and of Union Switch & Signal Co.

A. Russell Wright was appointed sales manager, **Robinson Fan Corp.,** Gilroy, Calif, succeeding **M. R. Robinson,** resigned.

E. H. Forsstrom was appointed to the newly created position of director of training, **Allegheny Ludlum Steel Corp.,** Pittsburgh. Assistant manager, Watervliet, N. Y., plant, he is succceeded by **W. J. Baldwin,** chief metallurgist of the plant.

DR. H. B. OSBORN JR.
. . . heads Cleveland technical group

Cleveland Technical Societies Council, composed of Cleveland's 42 technical and scientific groups, has named as its president **Dr. H. B. Osborn Jr.,** technical director of Ohio Crankshaft Co., who also is chairman, Cleveland Chapter, American Society of Tool Engineers.

Phillip A. Formel was named central New York state sales engineering representative of **National Radiator Co.,** Johnstown, Pa.

Earl Mendenhall has been elected president, **Sterling Electric Motors Inc.,** New York and Los Angeles. He succeeds **Carl E. Johnson** who was elected board chairman. Mr. Mendenhall has been associated with Mr. Johnson for over 34 years, and in turning over active direction of the Sterling organization, Mr. Johnson will devote his time to further development of Sterling electric power drives. Mr. Mendenhall will concentrate on further development and expansion of existing manufacturing plants, engineering and sales offices.

Carl J. Parsch was appointed advertising manager, **Acheson Colloids Corp.,** Port Huron, Mich.

J. T. Williamson was appointed to the newly created post of central division sales manager, **Cory Corp.,** Chicago.

Kewanee Boiler Corp., Kewanee, Ill., elected **W. B. Russell** as president to succeed the late **R. B. Dickson.** Mr. Russell, formerly vice president, also was elected a director. **V. D. Curtis** continues as assistant to Mr. Russell.

DONALD H. THORBURN
. . . president, Gas Machinery Co. (Canada)

Donald H. Thorburn was elected president, **Gas Machinery Co. (Canada) Ltd.,** a newly formed company for engineering, fabrication, and erection of gas plant equipment. It is associated with Gas Machinery Co. of Cleveland, and brings to the Canadian gas industry the newest in design and manufacture of plant equipment and industrial furnaces. For the present, offices will be in the Herald building, Hamilton, Ont. Mr. Thorburn, who had former association with various gas companies, has spent 23 years of service in the industry, and since 1948 has been manager of the gas division of Salem Engineering (Canada) Ltd. Serving with Mr. Thorburn on the board of directors is **Vincent Wagar** of Hamilton; another director is **K. W. Stookey,** president of Gas Machinery Co., Cleveland.

F. C. Shafer, for the last 12 years vice president of **Imperial Brass Mfg. Co.,** Chicago, and associated with the company 24 years, has been elected president and chairman of the board of directors. **C. H. Benson** and **J. T. Greenlee** were named vice presidents. Mr. Benson is sales manager, distributor sales, and Mr. Greenlee is sales manager, original equipment sales for the company.

R. W. Powell, advertising manager, was promoted to manager, plastics division sales, **Hydraulic Press Mfg. Co.,** Mt. Gilead, O. **C. P. Terry** is the new advertising manager.

Pontiac Motor Division, General Motors Corp., Pontiac, Mich., appointed **Harry C. Pratt** as Buffalo zone manager succeeding **Edward M. Krotine,**

S.E.C.O. BOOSTS PRODUCTION 22%

Sunoco Emulsifying Cutting Oil Ends Rusting, Decreases Downtime, Results in Big Savings

When an emulsifying cutting oil is unable to prevent excessive rusting on machined surfaces, that's bad. But if, in addition, it has an offensive odor, that's worse . . . especially if you have to change it twice a week and thoroughly clean the machines. Three years ago a large manufacturer of electrical products sought a solution to just such a problem. It occurred in his machining of cast iron end-bearing cages for induction motors.

His search ended when a Sun representative introduced him to Sunoco Emulsifying Cutting Oil. Not only has S.E.C.O. prevented the rusting condition, but also cutting fluid changes are now spaced six weeks apart. Translated into management language, the performance of S.E.C.O. has boosted production, curtailed costs, effected savings. By sharply decreasing downtime, it has increased output 22 percent. Savings on oil and maintenance costs are amounting to almost $5,000 a year. The manufacturer is so well satisfied with Sunoco Emulsifying Cutting Oil that he uses it now in every machine which requires a soluble oil.

In all machine shop operations, on both ferrous and nonferrous metals, you'll find Sunoco Emulsifying Cutting Oil and Sunicut straight cutting oils of real assistance. They help maintain production schedules, lengthen tool life, and keep operating costs down. For a free Sun cutting oil recommendation card, write Department S-5.

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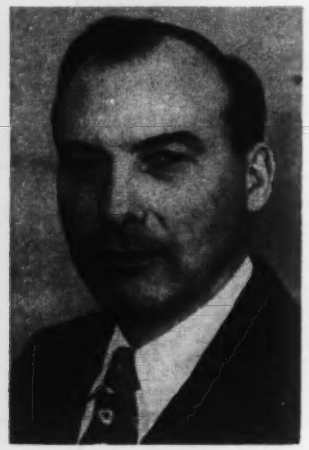


A. B. PARNALL
. . . *Osborn's vice president-manufacturing*

ROBERT WIER JR.
. . . *Osborn VP, brush division sales*

named Charlotte, N. C., zone head who succeeds **Sidney G. Whiting.**

A. B. Parnall was elected vice president of manufacturing, and **Robert Wier Jr.**, vice president, brush division sales of **Osborn Mfg. Co.**, Cleveland. Mr. Parnall joined the company in 1925 and assumed the duties of treasurer, his most recent position, in 1942. Mr. Wier joined Osborn in 1945 as general sales manager. He was previously sales manager for the Western-Winchester Divisions of Olin Industries.

Inland Steel Co., Chicago, appointed **Robert M. Buddington** as assistant manager of sales, sheet and strip division, effective May 15. He will replace **William P. Burke,** resigned to start his own business. At present Mr. Buddington is serving as assistant to the manager of sales in the division. **Howard M. Graff** was appointed assistant general superintendent of the company's iron ore mines. He formerly was superintendent of the quarry of Inland Lime & Stone Co., an Inland Steel subsidiary, near Manistique, Mich.

Gordon C. Harvey was appointed division engineer, ballast engineering division, **General Electric Co.**, Schenectady, N. Y. **C. E. Burke** was named manager of sales, specialty transformer and ballast divisions, Fort Wayne, Ind. **Paul M. Deal** was named administrative assistant, fractional horsepower motor divisions, and **Robert B. Moore** as manager, mining division, industrial engineering divisions. The latter will succeed **R. S. Sage,** who plans to retire later this year.

Plymouth Locomotive Works, division of Fate-Root-Heath Co., Plymouth, O., appointed **Robert H. Schleuning,** Pittsburgh, as sales representative for switching locomotives and other products in western Pennsylvania and New York, northern West Virginia and parts of Ohio and Maryland. Mr. Schleuning formerly was with Pressed Steel Car Co. Inc.

Norman F. Garrett, general manager, Solar-Sturges Mfg. Division, Melrose Park, Ill., was elected a director of **Pressed Steel Car Co.,** Pittsburgh. He succeeds the late **H. J. Gearhart.**

Dr. George H. Zirker was appointed chief metallurgist of **Burndy Engineering Co. Inc.,** New York. He formerly was with Foundry Service Inc.

J. L. Mauthe was elected president, **Youngstown Sheet & Tube Co.**, Youngstown. He succeeds **Frank Purnell,** elected chairman of the board, a position vacant since the death in 1939 of **Henry G. Dalton.** Mr. Purnell relinquishes the presidency which he held 20 years. **Alfred S. Glossbrenner** was elected vice president in charge of operations. He formerly was assistant vice president in charge of steel operations, and in his new position succeeds Mr. Mauthe.

Drake Steel Supply Co., Los Angeles, elected **F. Burneby** assistant vice president, and **R. E. Ware** as treasurer. Both were also elected to the board of directors.

Edward L. Soule Jr. was elected vice president and general production manager of **Soule Steel Co.,** San Francisco, in charge of all plants.

E. D. Bullard Co., San Francisco, appointed **George R. Huffman** as advertising manager, and **E. W. Bullard Jr.** as assistant to vice president in charge of sales, **Alpheus Bull.**

J. P. Murphy was transferred from **Dow Chemical Co.'s** magnesium technical service and development group to the magnesium sales staff of the company's Chicago sales office.

Arcos Corp., Philadelphia, appointed **Bernard E. David** as a special field engineer located in Los Angeles; **Walter G. List** as special field engineer in the Ohio-western Pennsylvania territory, assisting Williams & Co. Inc., Pittsburgh, in sales of Arcos electrodes; and **J. J. Schlass** as sales representative in Philadelphia.

Arden J. Mummert, executive vice president, was elected president, **McQuay-Norris Mfg. Co.,** St. Louis, to succeed **Arthur G. Drefs,** elected chairman of the board of directors. **W. K. Norris,** founder of the firm, who has been ill for many months, was elected honorary chairman. **Ballard A. Yates** was elected vice president in charge of manufacturing, and **Charles C. Tapscott,** vice president, to the newly created job of sales promotion director.

R. F. Hepenstal was appointed assis-

J. L. MAUTHE
. . . *heads Youngstown Sheet & Tube*

ALFRED S. GLOSSBRENNER
. . . *V-P-operations, Sheet & Tube*

tant general manager of manufacture for **American Can Co.**, New York.

Paul Garrett, who has been serving **York Corp.** as commercial service supervisor of the Southwest district, Houston, has been transferred to the home office at York, Pa., and is succeeded at Houston by **Frank Fairfield,** formerly commercial service supervisor, Seattle office.

Advance Spring Corp., Chicago, elected **Frank W. Bemm** president. He succeeds **D. E. Mielke,** who sold his interest and is no longer connected with the company. Mr. Bemm started with the firm 25 years ago, and about ten years ago, with Mr. Mielke, purchased the company from its founder, the late **F. C. Mueller.** Mr. Bemm has been vice president in charge of manufacturing. **W. J. Grede,** president of Grede Foundries Inc., Milwaukee, has become associated with Mr. Bemm, and, although not active in the management, will serve as vice president and director.

Ervin J. Bookout was appointed eastern sales manager, **Cochrane Corp.,** Philadelphia, manufacturer of water conditioning equipment and steam power plant specialties.

Randolph E. Wolcott was named purchasing agent of **National Motor Bearing Inc.,** San Francisco.

Matthew J. Heiler has been named a special representative for **Willys-Overland Motors Inc.,** Toledo, O.

BARTON E. BROOKE
. . . new VP-Treas., Morrison Engineering

Barton E. Brooke was elected vice president and treasurer of **Morrison Engineering Corp.,** Cleveland. Formerly associated with Lombard Corp., Youngstown, he has been active in the industrial heating field for several years.

Walther H. Feldmann was elected vice president in charge of sales, **Worthington Pump & Machinery Corp.,** Harrison, N. J. He resigned as president of the corporation's subsidiary company, Electric Machinery Mfg. Co., Minneapolis. **John J. Summersby** was elected vice president in charge of purchases for Worthington. **Frederic W. Thomas** becomes general manager of purchases, and **Carleton Reynell,** general representative, sales and purchasing departments. Mr. Feldmann will make his headquarters at Harrison.

EMMET F. HARDING
. . . joins Russell, Burdsall & Ward

Emmet F. Harding, formerly general sales manager, American Hardware Corp.'s Corbin Screw Division, New Britain, Conn., has joined **Russell, Burdsall & Ward Bolt & Nut Co.,** Port Chester, N. Y., as manager of screw sales. During his 27 year career, which includes 15 years of selling on the West Coast and in New England, Mr. Harding has been with American Hardware Corp., and prior to that, with Henry Disston & Sons Inc., Philadelphia.

Herman Brown and **Kenneth A. Spencer** are newly elected directors of **Armco Steel Corp.,** Middletown, O.

Col. Wm. P. Cornelius was appointed manager of the new district office in Houston of **Giffels & Vallet Inc.** and **L. Rossetti,** associated engineers and architects, Detroit.

OBITUARIES . . .

George A. Yost, 71, from 1942 to January, 1949 president of **Lucas Machine Tool Co.,** Cleveland, died Apr. 19. When in 1949 the company was sold to New Britain Machine Co., Mr. Yost retired. He had been associated with the Lucas organization since 1902, and was successively secretary and vice president before heading the company.

Freeman A. Cobb, 68, plant engineer for **National Vulcanized Fibre Co.,** Wilmington, Del., died Apr. 13.

Herbert C. Fellows, 78, who retired about two years ago after 50 years of service with **Fellows Gear Shaper Co.,** died Apr. 3 at his home in Springfield, Vt. He was a brother of the late Edwin R. Fellows, founder of the company, and was a specialist in design metallurgy and manufacturing of gear shaper cutters. He served as superintendent of the cutter department, as chief metallurgist and more recently as supervisor of research.

Wilbur F. Pray, 50, New York district sales manager, **Askania Regulator Co.,** Chicago, died in Boston Apr. 16. He had been associated with Askania since 1933.

Schuyler G. Alden, former district sales manager, eastern division, **U. S. Hoffman Machinery Corp.,** died Apr. 18 in Florida.

John H. Barrett, founder in 1924, and president of **Sterling Pattern Works,** Rochester, N. Y., died Apr. 16.

Walter S. Walls, 77, retired vice president, **Simonds Worden White Co.,** Buffalo, died Apr. 18.

Melvin J. Proud, 54, manager, tractor division export department, **Allis-Chalmers Mfg. Co.,** West Allis, Wis., died Apr. 17 in San Jose, Costa Rica. Associated with Allis-Chalmers since 1935, he had been in charge of foreign tractor sales since 1948.

Walter S. Overton, 70, auditor for **Douglas Aircraft Co. Inc.,** Santa Monica, Calif., died Apr. 14.

Leslie M. Gumm, consulting sales engineer and former manager of steel mill and metalworking sales for **Westinghouse Electric Corp.,** Pittsburgh, died Apr. 19.

Edward C. Strong, 84, one of the founders and former vice president, **Atlas Steel Casting Co.,** Buffalo, died Apr. 17. He was retired.

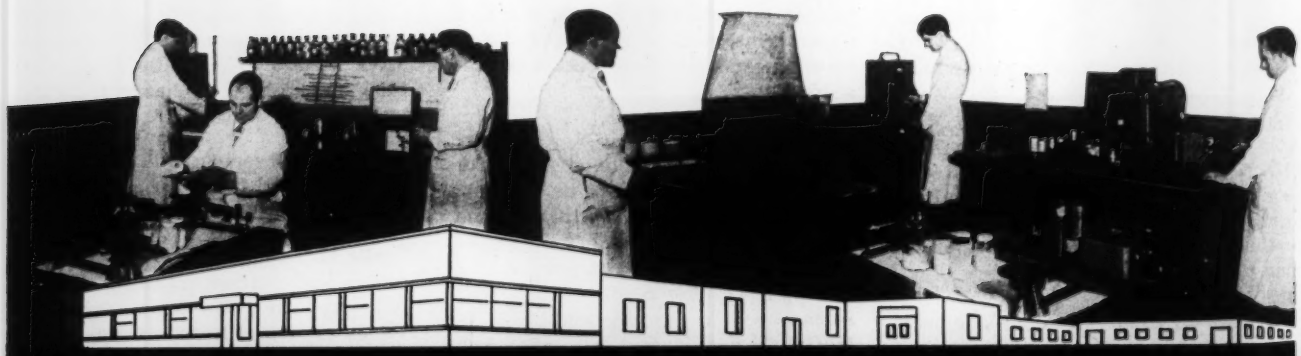
Francis I. Kemp, manager, vertical turbine pump division, **Worthington Pump & Machinery Corp.,** Harrison, N. J., died Apr. 14.

Announcing . . .

"fluid-film", the all-purpose die lubricant for light or heavy stampings - the latest thing in semi-plastic emulsions, a non-pigmented compound with great film strength.

- *Clean it*
- *Anneal it*
- *Weld through it*
- *Dilute it (within limits)*
- *Draw with it (wet or dry)*
- *Brush it - dip it - roll it - spray it*

"fluid-film" is low priced, easy to apply and easier to clean, making it a real buy in the die lubricant field. We're sure this is what you have been looking for.



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Production AND Engineering
NEWS AT A GLANCE

SPEEDS AIRCRAFT CONSTRUCTION—A new aluminum extrusion process developed by Reynolds Metals Co., Louisville, under sponsorship of Air Materiel Command, Wright Field, Dayton, O., is expected to speed up mass production of aircraft and provide considerable savings in manufacturing and materials costs. The method makes it possible to construct skin and skin stiffening elements of aircraft as one part. Aircraft engineers believe the aluminum extruded, integrally-stiffened skin construction eventually will make it possible to build whole plane fuselages whose strength and weight would make them superior to those in current use. Many possibilities also are seen for the technique in reducing weight and saving space in buses and railroad equipment.

U-SHAPED PRODUCTION LINE—Seven-speed conveyor system plays a key role in the U-shaped mechanized heat treating setup employed to process special screws at American Screw Products Co., Cleveland. Entire operation is confined in an overall distance of 80 feet. The conveyor system carries the products through a three-station hardening furnace, an oil quench, around two right-angle turns and into a washing machine.

PUTS SQUEEZE ON COSTS—A new automatic multioperation machine built for an automotive manufacturer by Automatic Tool Co., Richmond, Ind., performs 2700 operations per hour at each of four positions simultaneously—drilling, reaming, rough and finish counterboring, chamfering, spotfacing and tapping both sides of each part—at the rate of 90 parts per hour. Operator's job is simply one of transferring parts from one position to another to complete both sides, and unloading finished parts.

AIDS MASS PRODUCTION FINISHING—Experimental and development work in the application of diamond abrasives in evolving new mass production techniques in precision lapping and polishing, carbide tool sharpening and die finishing is facilitated by a diamond compound kit currently made up by Elgin National Watch Co., Elgin, Ill. The six compound grades included are designed to produce almost any desired finish on carbides, tool steels and other hard materials.

WATER-ACTUATED "SWITCH"—A control device that responds to flow of cold water to open or close an electrical contact, reported by General Electric Co.'s Control Divisions, actually acts as a fuse in a circuit that depends upon water cooling for protection. It can be used in welding units, induction heating setups, for water cooling dynamometers and many other applications.

JUMPS TOOL LIFE—Increased life of at least 50 per cent is guaranteed by a low-cost process of treating tools developed by Sol-ven-ite Laboratories, Chicago. For some users, the company reports, the process lengthened tool life as much as 400 per cent. The method, which is employed only on high-speed steels, provides tools that are completely finished ready for use without further grinding. The treatment creates no dimensional changes or distortion even in the thinnest sections. Currently, the concern is set up to provide customers with 24-hour service.

PLATING "VITAMINS"—In electroplating, addition agents act somewhat like vitamins in the human body. They have the same startling effects in minute concentrations. Recently, a new "vitamin" was developed. This one—a metallic inorganic compound—is not susceptible to detrimental decomposition products, and not affected by activated carbon. When used in connection with the PR-plating process, the result in copper plating is so successful that in many cases buffing is eliminated. Buffing costs in the auto industry average as high as 70 per cent of the total finishing costs. To say then, that advantages can be derived is putting it mildly. (p. 86)

NO FORMULA—In considering cold rolling operations, one must be careful not to assume that just because a roll forming machine is capable of producing 10 million feet per year, that it cannot be profitably operated on a very small fraction of this amount. Just where the line is drawn cannot be decided by any fixed formula. Since roll forming always means lower unit cost, the question can most easily be decided by simply ascertaining initial cost of the machine with tooling. Big thing to remember is that if quantities required are enough to warrant initial outlay, it will always result in lower unit cost. (p. 91)

SAVES OPERATIONS—Several operations involving complicated press dies are by-passed with the use of a special bender in Hotpoint's dishwasher fabricating procedure. The unit which processes partly formed cabinet bottoms, makes six 90-degree bends in five steps following touching of a pushbutton. With a three-man crew, machine forms cabinet bottoms at a rate of 325 per hour. Die used is inexpensive and performs operations literally beyond that of an ordinary press. (p. 94)

HIGH UNIFORMITY — Most outstanding feature of cascade pickling is that solution can be controlled to a high degree of uniformity from day to day and from month to month. For example, average acid consumption for a 16-month operation was 34.8 pounds per ton. Although this figure is 0.9 pounds per ton higher than that obtained with batch pickling, it is still considered quite good. (p. 102)

Brighter Finishes with "PR"

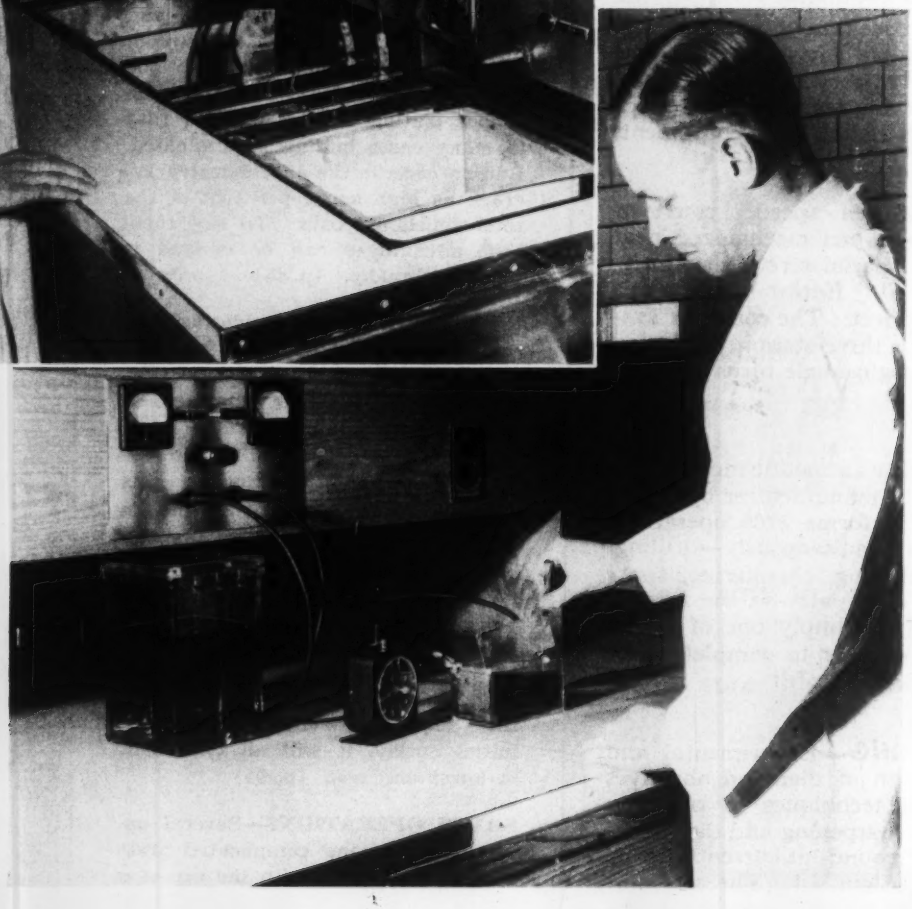
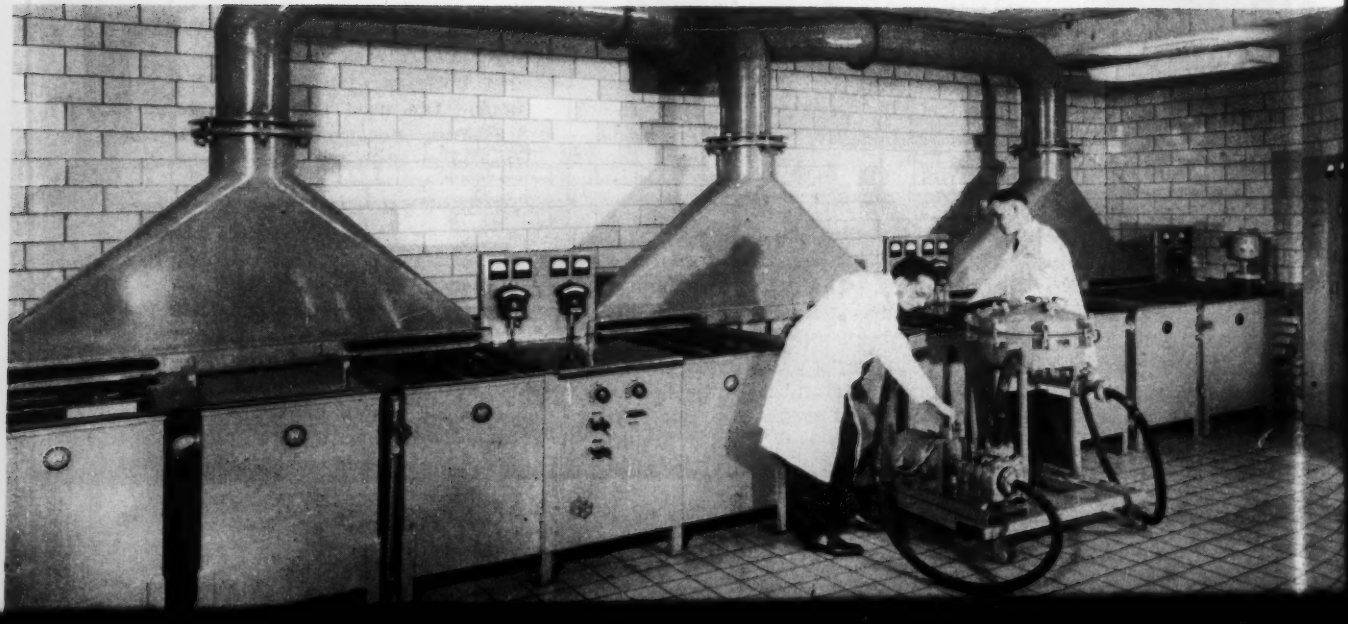


Fig. 1 (left above)—Four-gallon tanks used in second development stage to get a better picture of the plating of irregularly shaped objects

Fig. 2 (left)—This view in the laboratory shows the Hull cell in which initial investigations on the PR process were made

Fig. 3 (below) — PR process pilot line at East Pittsburgh, showing 100-gallon tanks



By GEORGE W. JERNSTEDT
Manager, Electroplating Projects
Westinghouse Electric Corp.
East Pittsburgh, Pa.

'PLATING

Periodic reverse current plating with a new addition agent is solving many electroplating problems, producing high luster, uniform density plates. On some applications, buffing and polishing costs can frequently be eliminated completely

BRIGHT electroplating has always been a headache to manufacturers despite the brilliance and pleasing appearance it gives their products. More often than not a bright-plating process that works well in the laboratory is less successful in the production line. Quality is not uniform, and the more rapidly the process is operated, the greater the need for buffing and polishing. If the processes are slowed down, a production bottleneck is formed, and even then buffing is often required. Periodic-reverse-current (PR) electroplating plus a new inorganic addition agent called Wes-X* seems well on its way to solving these and many other problems associated with bright copper plating.

"Vitamins"—In electroplating, addition agents act somewhat like vitamins in the human body. In general, their composition is roughly similar, in that vitamins and addition agents are both composed of carbon, hydrogen, nitrogen, and sulphur atoms. Organic addition agents are typified by compounds such as saccharin and nickel naphthalene trisulphonate. These compounds in plating solutions, like vitamins in the human body, have startling effects in minute concentrations, and, therefore, are generally known as addition agents since they consist of such a small portion of the plating bath. Their concentration is generally from 0.01 to 0.5 ounce per gallon.

A serious disadvantage of organic addition agents is that they are susceptible to decomposition by electrolytic oxidation or reduction, and the decomposition products quite frequently are detrimental to the plating bath. When these decomposition products build up in a solution, the bath must be treated with activated carbon, which selectively removes both the decomposition product and a portion of the original organic addition agent. However, in many cases the decomposition products are not removed by activated carbon, and control of the plating process becomes difficult.

Metallic Inorganic Compound—Recently a new type

* Wes-X (Trademark) metallic, inorganic, cyanide copper electroplating addition agent

Fig. 4 (below)—General view of part of the electroplating laboratory at Westinghouse

Fig. 5 (right)—A PR-plated door for an automatic washing machine

of addition agent—a metallic inorganic compound—has been developed for the production of bright copper plate. The material is not susceptible to detrimental decomposition products and is not affected by activated carbon. As a result, the solutions can be continually treated with activated carbon to remove extraneous organic material, thereby maintaining a high-quality solution even under heavy production schedules. This agent, plus the PR-plating process, makes possible full bright copper plate and in many cases totally eliminates buffing. In the automotive field, buffing costs for high luster finishes average as high as 70 per cent of the total finishing cost. Thus this new plating process is of vital importance.

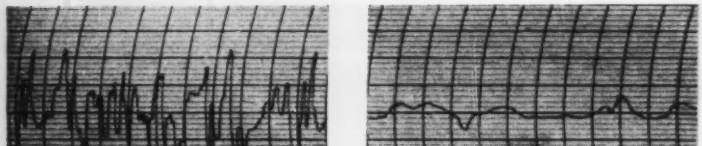


Fig. 6—Surface profiles of the washing machine door before (left) and after (right) PR plating

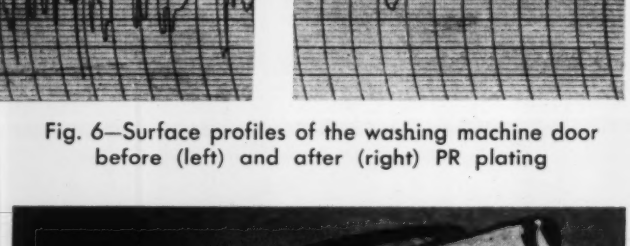


Fig. 7—No buffing, except one simple coloring operation, was done on this PR-plated cover for an iron

Fig. 8—Current wave with field reversal (left) and with contactor reversal (right). Cycle in each case was 5 seconds plating, 1 second deplating

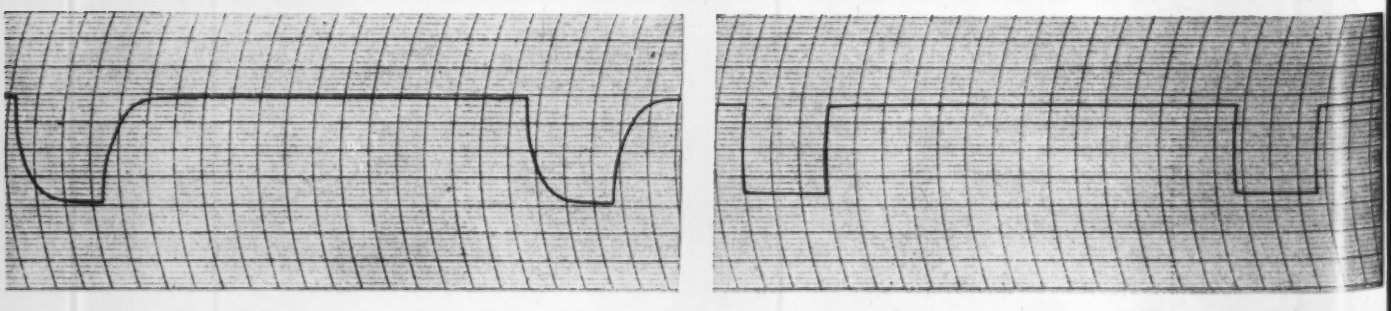
Fig. 9—A rotogravure roll plated by the PR process

Various aspects of the new process have been carefully explored in the laboratory, and a great many tests made over a wide range of variables—temperature, solution composition, agitation, anode corrosion, and the many other items involved in the electroplating process. Initial investigations were in a Hull cell, Fig. 2, which enables a single plating test to give results over a range of current densities from 10 to 300 amp per square foot; then tests were moved to 4-gallon tanks, Fig. 1, to get a better picture of the plating of irregularly shaped objects. Finally a pilot line, Fig. 3, was set up. This consisted of 100-gallon tanks where standard parts from appliance divisions and automotive plants were plated to determine whether specifications could be met. After pilot-line operation, the process was applied to several large production lines with outstanding results; it is now ready for widespread commercial application. In less than 9 months, over 50,000 pounds of the material (Wes-X) have been manufactured and it is now a standard item of production.

PR Current Process—The PR-plating process consists essentially of periodically reversing the dc plating current for a definite time interval. By repeating this operation, the plate becomes smoother, and metal of higher quality is deposited. Normally, with conventional direct current, electrodeposits become progressively more nodular, i.e., the crystalline structure becomes larger. By reversing the current, the crystal growth is interrupted, and when current is reapplied in the plating direction new crystals commence to form, the final result being the all-over fine grain structure that is characteristic of "as plated" bright deposits.

Uniform Deposit—Due to a phenomenon known as polarization, when metal is removed the net result of reversing the current is a more level and uniform deposit over the whole plated part. With normally applied direct current, the edges and outer extremities on any particular part generally build up from 50 to 100 per cent greater (*Please turn to Page* 108)

Fig. 10—Field reversal (left) and contactor reversal (right) current waves with a 15-second plating, 3-second deplating PR cycle



New Motion Conversion Principle

ADDS FLEXIBILITY TO HAND TOOL OPERATIONS

COMPANIES using hand tools on their production lines for weld chipping, peaning, channeling, gouging, punching, and many other miscellaneous operations, stand to profit through use of a new principle of motion conversion embodied in the electric hammer currently produced by Noble & Stanton, Bedford, O.

This heavy duty unit, which speeds up many laborious jobs in the metalworking field, is said to hit as hard and as fast as heavy, more expensive electric hammers, weighs only 7½ pounds and is priced well under $100. Using a metal-cutting tool, the hammer clean cuts automobile fender stock at a speed of 6 inches per second, without a starting hole and can also drill concrete or masonry at a rate of better than 1 inch per minute. Its light weight and freedom from vibration permits use in one hand, even on a ladder or scaffolding, or in difficult locations.

Not only does the tool's unique principle eliminate the fatiguing "kick" characteristic of many electric hammers; it also eliminates direct vibration in the motor armature and other working parts, thereby markedly reducing maintenance, wear and breakage.

Patent Contains 13 Claims of Novelty—The tool's novel means for converting rotary motion to reciprocating motion is covered in a patent which allows thirteen claims of novelty. Known as the Super-Slugger, the hammer is powered by a 3.5 ampere 1/3-hp heavy duty motor and operates on either 110-v 60 cycle ac or 110-v dc current. An integral fan cools both the motor and hammer action while three thousand positive blows per minute are delivered in the same plane as that of the armature shaft.

The Neoprene blocks utilized in the design and direction of motion produce a fast, positive blow with no shock or vibration transmitted to the motor or operator. The blocks through which the motion is transmitted also give a snap to the blow delivered on the tool by a reciprocating piston whose motion is fast and positive. Normal piston travel of ⅝-inch is increased to 1⅛-inches at full speed due to the blocks resiliency.

In addition to its many metalworking abilities, the unit is also indicated for the drilling of masonry or concrete, removing flooring, cleaning and pointing up mortar joints, installing lead shields, channeling concrete, scaling rust, cleaning and peaning welds, ironing-out fender and body dents, cutting soil pipe, riveting, loosening of bolts and studs, and many other operations. Any tools may be used with the hammer if they can be held in the chuck. A taper shank adapter is available to hold taper shank tools. Blanks are also provided if the user wishes to make his own tools. However, tools for special applications will be designed by the producer. It is claimed that one man with the new hammer can do the work of ten men using ordinary hand tools.

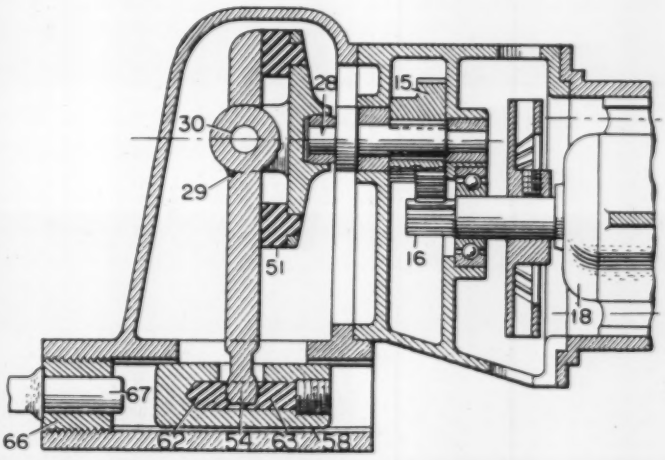


Fig. 1 (top)—Principle of hammer operation is as follows: Electric motor, 18, operating at 10,000 rpm is geared down, 15 and 16, to 3000 rpm at the eccentric or crank mechanism, 28, which in turn activates the rocker arm assembly, 29, mounted for oscillation on shaft or pin, 30. Resilient Neoprene rubber elements, 51, 62 and 63, connecting the elongate beam and rocker arm and engaging the knob of the beam's free end, 54, impart a "whipping action" to the reciprocating element or piston, 58, and help reduce vibration. Shank of the reciprocating work tool, 67, is contained in a threaded bushing, 66. This "whipping action" results in an increase in the length of stroke of the piston over what it would be if rigid instead of resilient connecting elements were used, and also results in an increase in the hitting power developed by the piston at or near the ends of its stroke. Identification numbers taken from original patent drawing

Fig. 2 (bottom)—Operator is shown cutting fender stock at a rate of 6 inches per second

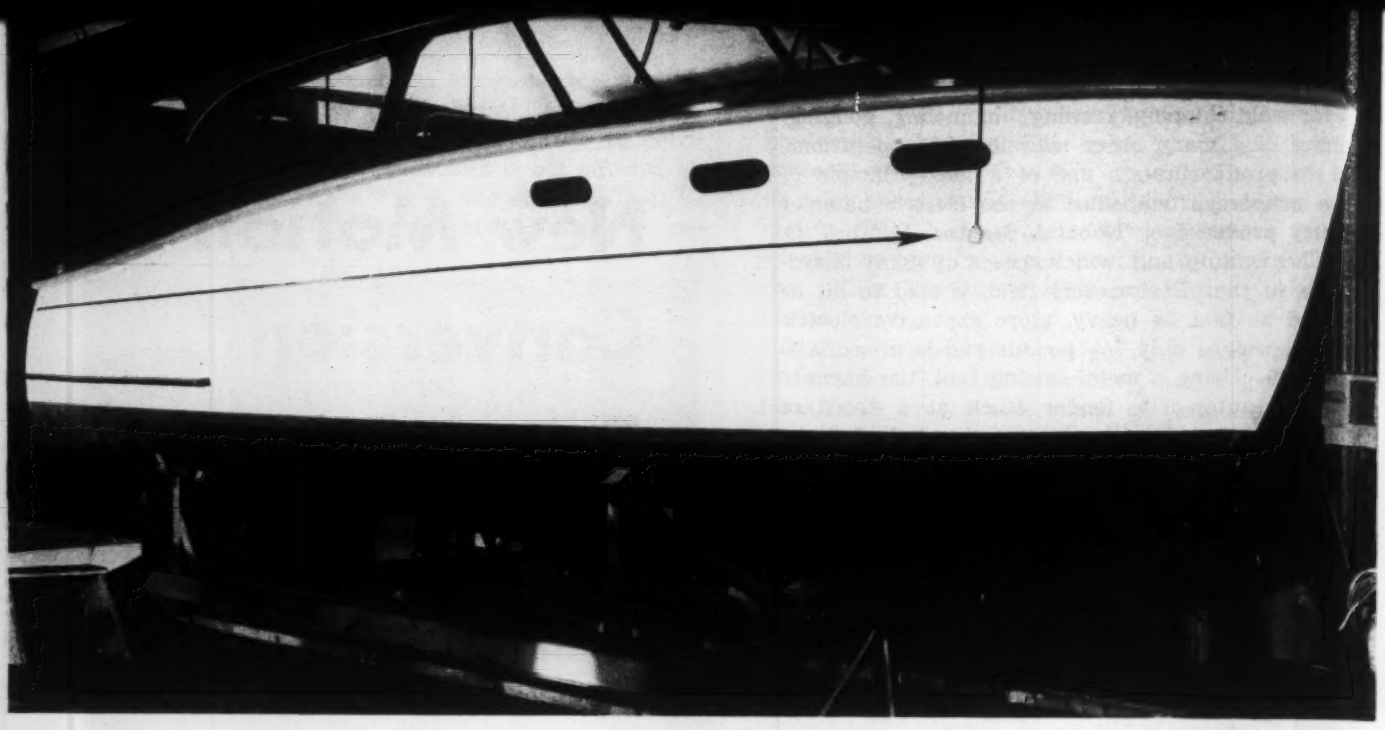


Fig. 1—Completed 35-foot luxury cruiser

SPECIAL JIGS and POSITIONERS

. . . speed production of all-welded steel boats

SPECIALLY designed tools, jigs and welding positioners make possible the production of all-welded motorboats from flat sheet steel at the West Haven, Conn., plant of Churchward Co. At full production, with 65 welders working, the efficient operations at this plant can turn out a 26-foot motorboat in 3 hours, ready for the water.

Steelcraft boat production is a unified operation that begins and ends within the plant. At the beginning of the 300-foot assembly line, copper-bearing sheet steel is Parkerized to prevent rust. Then it is cut to size and started down the line through numerous forming machines and jigs. The first welds are fit-up tacks that make sectional units out of the component hull parts. These units converge on a specially-designed rotary jig—one for each model size—where final fit-up and finish welding turns out the Seavee hull, an exclusive Steelcraft design.

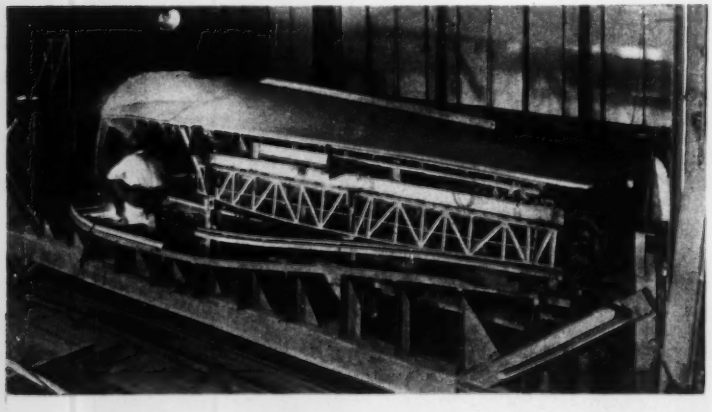


Fig. 2—Bottom unit of 26-foot hull clamped on a rotary jig. Welder is tack-welding the bow deck unit, first of the component hull parts fitted up on this jig. Type HTS electrodes, sizes 5/32 and ⅛-inch are used for all tack and finish welding. This model uses 11-gage alloy steel for the hull bottom, 12-gage for the top and sides

When a bottom unit has been fitted up and tack welded, it is clamped on top of the rotary jig. This clamping prevents distortion during finish welding. Fitted-up units that make the bow deck, washboards, transom and stern deck are fitted to the bottom unit. Then the jig is rotated one-quarter turn and a side unit tack welded in place. Rotation of another one-half turn brings the other side of the jig to the top. The remaining side unit is fitted up and tacked. With all component units in place, finish welding of the entire hull begins. During this phase, the jig is rotated to facilitate downhand welding.

After finish welding, the hull is removed from the jig and placed bottom down on a wheeled cradle. This is moved along from station to station down to the end of the line where the complete boat is taken off, the paint dried and the boat fully rigged.

Playing a major part in building the boats are Murex electrodes, made by Metal & Thermit Corp., New York. Type HTS electrodes are used exclusively for all the welding.

COLD ROLL FORMING

can be engineered for high productivity — low operating and maintenance cost

By ELMER J. VANDERPLOEG
Assistant Chief Engineer
The Yoder Co.
Cleveland

PART II

INHERENTLY, cold roll forming is applicable mainly in the mass production of shapes of uniform profile. A limited amount of transverse forming may be done, but the width must be uniform, unless blanks are first cut and fed into the machine.

Minimum practical radius of bends is equal to the thickness of the stock but it should preferably be double the stock thickness or better. With some sacrifice of strength, sharp inside and outside corners are, however, obtainable. In forming wide shapes from thin stock, some bending at or near the outside edges is necessary to stiffen them and avoid waviness.

Conversely, maximum thickness of stock suitable for forming depends on the material used and on the angle or radius of bends or curves. As mentioned, plain angles, channels and other structurals up to

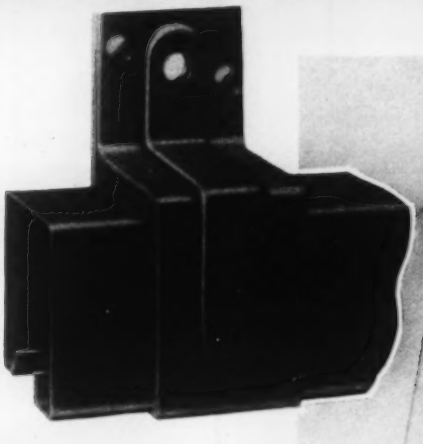


Fig. 9 (above)—Cold roll formed trolley rail and hanger for doors of garages, farm and commercial buildings

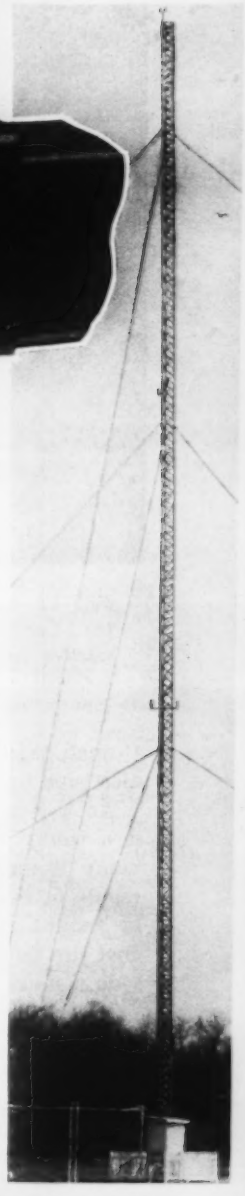
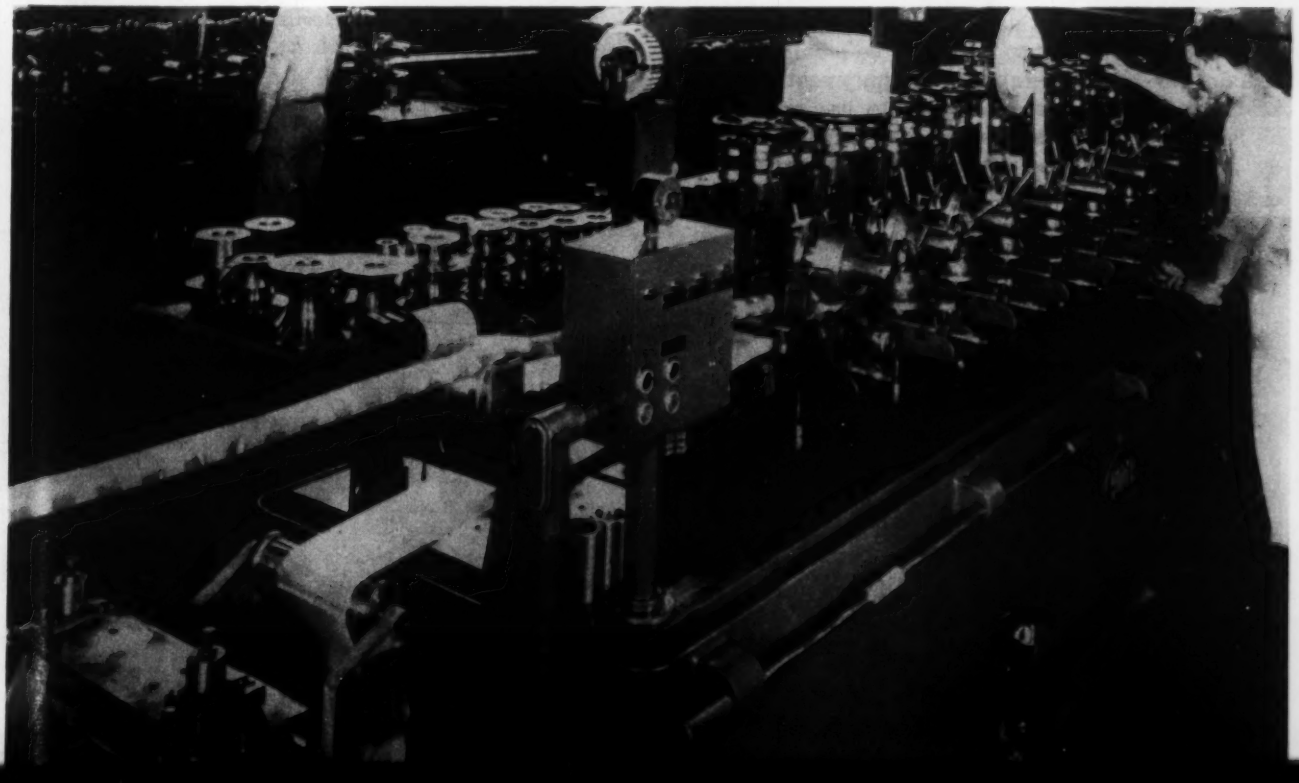


Fig. 10 (right)—This 288-foot tower was made from cold roll formed relatively light V-shaped sections

Fig. 11 (below)—New type of exterior covering being applied to telephone cable. The cable core in the foreground together with paper and aluminum coiled strip is pulled continuously into and through a Yoder cold forming machine, seen in the background



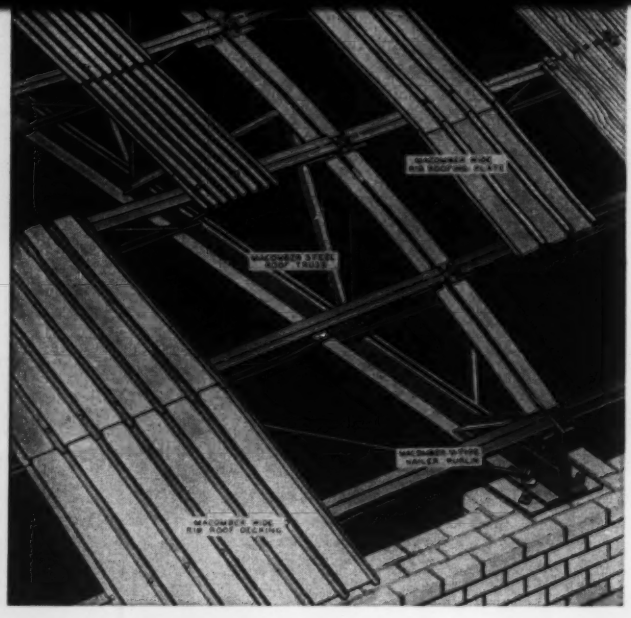


Fig. 12—Miscellaneous shapes made by Macomber Inc., Canton, O. used in building construction. Distinctive feature of the open web bar joists is nailable cold roll formed top chord

½-inch thick have been and are being produced, and also pipe up to 2/3-inch wall thickness.

As a general rule, it may safely be assumed that if a thing can be roll formed as is, or redesigned to make it suitable for roll forming, this method will result in reduced unit cost, either because of saving in weight and raw material alone, or in conversion cost, or both. A roll forming machine will also provide a much greater production per hour.

Where the material cost is high in relation to conversion cost, the saving in unit cost of finished shapes is likely to be the more important of the two factors. This being the case, the first and most important, if not the most difficult task, of tooling and production men generally is to find or discover the places where roll forming is practical. This is a relatively much simpler task when production of a new product is to be started. At this time, however, quantity requirements are likely to be either so small or so uncertain, the initial investment in equipment relatively so high, that it is often decided to use mill shapes, or have the shape cast, stamped, extruded, or made by any other method involving the lowest possible initial investment in molds, dies and other tooling. If power presses already are available in the plant, and only the initial die cost has to be considered, this method is often chosen as a matter of course.

Various Functions Performed—Often it is also erroneously assumed, without prior investigation, that roll forming for some reason or other is not suitable. The reason may be thought to be that the shape has to be curved, pointed, or otherwise shaped into an ornamental or functional pattern, or the section perforated, notched, embossed, indented, welded, etc. Any or all of these functions can, under most conditions, easily be performed in a roll forming machine, or in synchronized attachments or auxiliaries.

In a large shop, one small roll forming machine placed in line with a press for punching out the blanks forms plain angles with specially designed ends. These two machines are attended by only one girl.

Cold roll formed trolley rails and hangers for doors of garages, farm and commercial buildings, storage houses, and many other types of buildings, are rapidly becoming standard. Fig. 10 shows a 288-foot tower made from cold roll formed relatively light V-shaped sections by Wind Turbine Co., West Chester, Pa., used for supporting Rhombic antennae as well as for vertical radiators in broadcasting stations.

Movable partitions and paneling for offices, reception rooms, are cold roll formed. Complete sections quickly assembled mainly from interlocking roll formed panels, structurals, and moldings. The interlocking joints are mostly integral parts of the panels and structurals, formed in a single pass through the machine at a great saving not only in first cost, but in assembly and erection cost.

Covering Cable—Fig. 11 shows a rather unusual application, credit for which goes largely to engineers of Western Electric Co. Here a new type of exterior covering is being applied to telephone cable. Cable core in the foreground together with paper and aluminum coiled strip are pulled continuously into and through a Yoder cold forming machine, seen in the background. The aluminum is wrapped around the cable and simultaneously corrugated transversely for

Figs. 13 and 14—Homes as well as light commercial buildings are framed entirely with cold roll formed structurals, factory assembled. Floor joists, wall and partition assemblies as well as roof trusses, are quickly and easily bolted into place

greater flexibility. Just before the seam is closed over the cable, a sticky substance (polyisobutylene) is injected for added protection. The cable then passes into the next machine where it receives a flexible exterior coating of polyethylene.

Cable, aluminum and paper are seen entering the roll forming machine at different points. This is a standard inboard type machine, but with the outboard spindle housings pushed back close to the inboard housing, so that the spindles are overhung for greater accessibility. Western Electric Co., installed three of these machines in operation in their Kearny, N. J. plant, and three in their Chicago plant.

Plate glass window moldings, are now made extensively by cold roll forming. In a typical case, the redesigning for cold roll forming of similar moldings resulted in a 48 per cent saving in weight and a 60 per cent saving in the total cost of the finished shapes. Window frames and sash, originally made of wood, are now extensively made by cold roll forming.

Miscellaneous shapes used in building construction, made by Macomber Inc., Canton, O. Distinctive feature of the open web bar joists is the nailable cold roll formed top chord. Design of the joist makes it equally advantageous as a secondary load-bearing member for both floor joists and roof purlins.

Frames For Buildings—Homes as well as light commercial buildings are framed entirely with cold roll formed structurals, factory assembled. The floor joists, wall and partition assemblies as well as roof trusses, are quickly and easily bolted into place. Conventional materials may be used for insulation, exterior and interior covering of the homes, while for farm and commercial buildings, corrugated sheets or cold roll formed panels are more frequently used. Trend toward use of cold roll formed building components at this time is very strong due to high cost, indifferent quality, scarcity and combustibility of wood. These factory-made shapes and assemblies are products of the Stran Steel Division of the Great Lakes Steel Corp., Detroit, Mich.

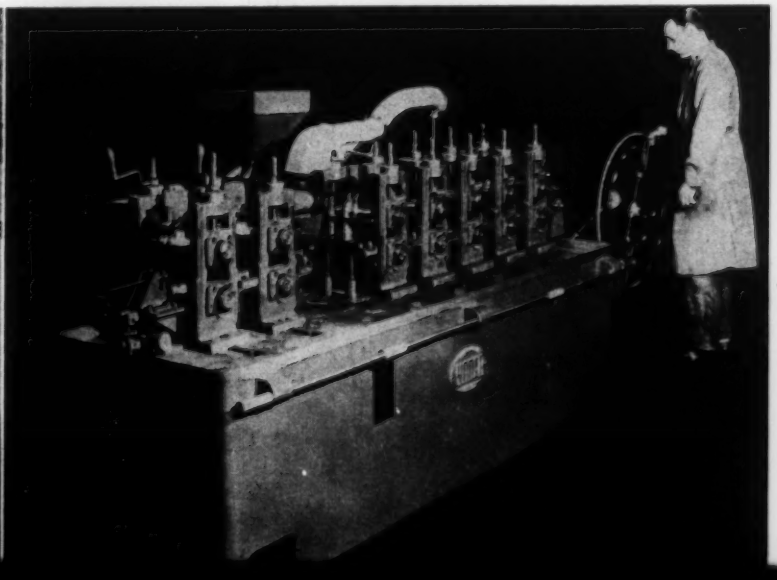
Billions of feet of cold roll formed shapes are used annually in American automobiles. They include drip moldings; outer body finished trim moldings; moldings for raising, lowering and framing the glass and the openings; door panel trim moldings, seat-frame J-sections; main seat frame moldings; front seat track; moldings in, on and around instrument panels, trunk, radiator, running boards, wheels, head lamps, etc. In addition, there are also many tubular sections, welded or unwelded.

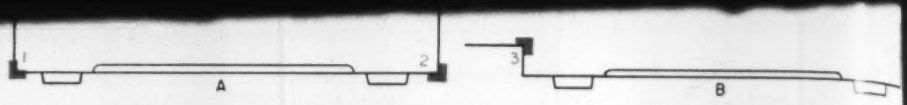
Co-operation Desirable—Some of these roll forming applications are obvious and logical, but others are not, at least not until somebody had first discoverd the idea and worked it out. In starting the production of new products, precedent naturally is apt to influence the thinking of most men. Co-operation between forming machine manufacturers and prospective users in each individual case is very desirable. The machine manufacturer, if properly informed as to character of product, quantity and quality requirements, present methods employed and costs, can be of assistance in determining whether roll forming is or is not practical, first cost of machine, and conversion cost.

Quantity requirements obviously are important, but one must be careful not to assume that just because a roll forming machine is capable of producing 10 million feet per year, that it cannot be profitably operated on a very small fraction of this amount. Just where the line must be drawn cannot be decided by any fixed formula. Since, however, roll forming, if at all applicable, always means lower unit cost, the question can most easily be decided simply by ascertaining the initial cost of the machine with tooling.

In other words, if the quantities required are sufficient to warrant the initial outlay, it will always result in lower unit cost. How soon it will pay for itself then depends on footage or tonnage, multiplied by saving per foot or ton. Whether you are going to roll form a mere hundred thousand feet or 10 million feet, the cost and the saving per foot will be about the same. The only difference is that in one case the machine is operated intermittently, for a short period, instead of full time. If the quantity is too small to warrant the initial investment, it may be found economical to have the shape made outside by a custom roll forming shop.

Fig. 15—This is a small standard inboard type machine arranged for forming and filling carbide welding rod. The pulverized carbide is carried on a feeder belt from the hopper to a line directly above the partly formed tube between the fifth and sixth roll stands. Here the tube, still open at the top to receive the carbide, is filled, to be closed in the following roll pass





Straight-Line Production Cuts Costs

FABRICATING DISHWASHER CABINETS

Important savings are derived from forming equipment tooled to produce cabinet bottoms at the rate of 325 per hour

By ERLE F. ROSS
Chicago Engineering Editor, STEEL
Photography by Dan Reebel

EARLY in 1947, Hotpoint Inc., Chicago, launched a $20 million plant expansion program to increase its production of electric household appliances. It included spending of several million dollars for enlarged facilities for manufacture of automatic front-opening electric dishwashers.

At that time, the company was producing dishwashers in its Chicago plant, but in the summer of 1947 purchased from the War Assets Administration a war plant in Milwaukee and immediately began to adapt and equip it for production of dishwashers, electric water heaters, sink tops and cabinets. The facilities acquired were plant No. 3 used by Allis-Chalmers Mfg. Co. during World War II for manufacture of aircraft turbosuperchargers.

The new dishwasher line was started in March, 1948, and full operation was attained by summer. Including a press shop, cabinet and tub manufacturing and finishing departments, wire basket and rack fabricating department, and final assembly line, the facilities provide modern straight-line flow and incorporate a number of interesting metalworking and materials handling operations.

Dishwasher cabinets are fabricated from 0.037-inch (20-gage) cold-rolled steel sheets and consist of two main components. The larger component, formed from a single sheet, constitutes the top and two sides and the smaller is the cabinet bottom. These components as-formed and ready for assembly are shown in Fig. 1.

Both components start in production in the press

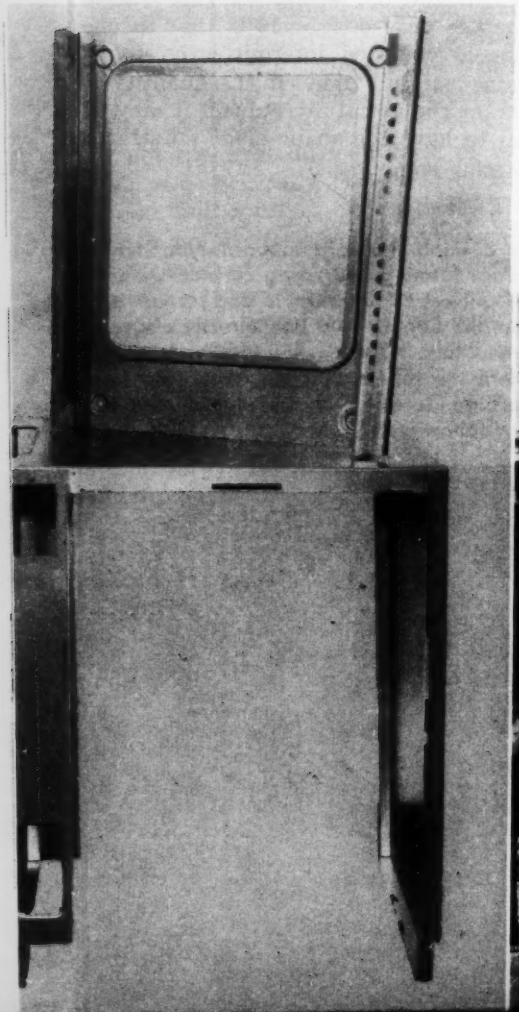


Fig. 1 (left)—Two main components make up dishwasher cabinet—the part which constitutes the top and sides, as shown in the lower portion of this illustration; and the bottom shown above

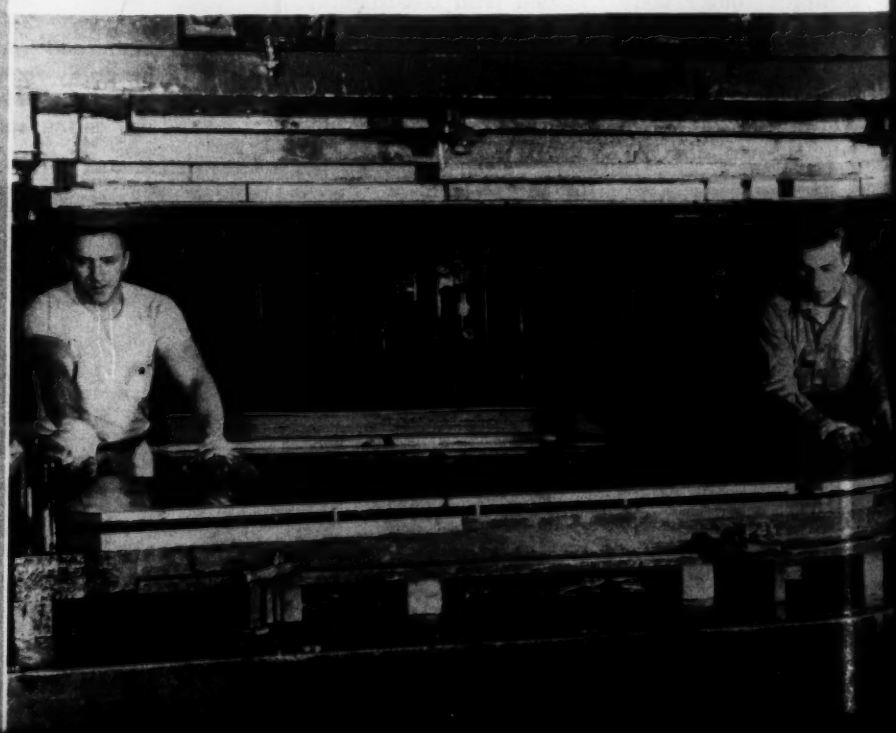


Fig. 2 (below)—Blanking and piercing larger cabinet component in a 400-ton Clearing press

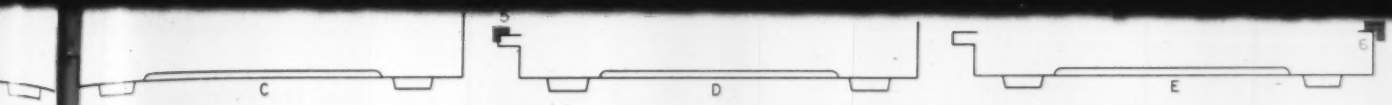


Fig. 5—This sketch shows detail and sequence of bends performed on the cabinet bottom

...sts for Hotpoint in

room on Clearing mechanical presses of which there are eight. Through incorporation of hydraulic cylinders in the upper slide or ram, the company has converted several of these presses from single-action into double-action units, this to accommodate to best advantage the wide variety of blanking, piercing and forming operations which must be performed. Devices are provided to lock out the second action when not needed.

Caster-Mounted Racks Utilized—The main cabinet component is blanked and pierced in a 400-ton press with 124 inches clearance between uprights (Fig. 2). Second operation is to form the sheet. Because the parts are long and limber and because the flanges produced in the forming operation are delicate, care must be exercised in transferring the parts from the press room to the fabricating department. For this reason, the company has devised welded steel caster-mounted racks having three series of ten cross-arms on each side to support the more or less flat parts in a horizontal position. An industrial truck is used to move the caster racks loaded with 20 cabinets to the first fabricating station.

Removed from the racks one at a time, the parts are placed on a table where weld nuts are attached at several locations by resistance welding. Next the part is transferred by roller conveyor to the die of a specially-designed forming machine supplied by Cyril Bath Co., Cleveland. The machine, a self-contained hydraulic unit, is shown in Fig. 3 with the flat cabinet section resting on the die ready to be formed into a U-shape.

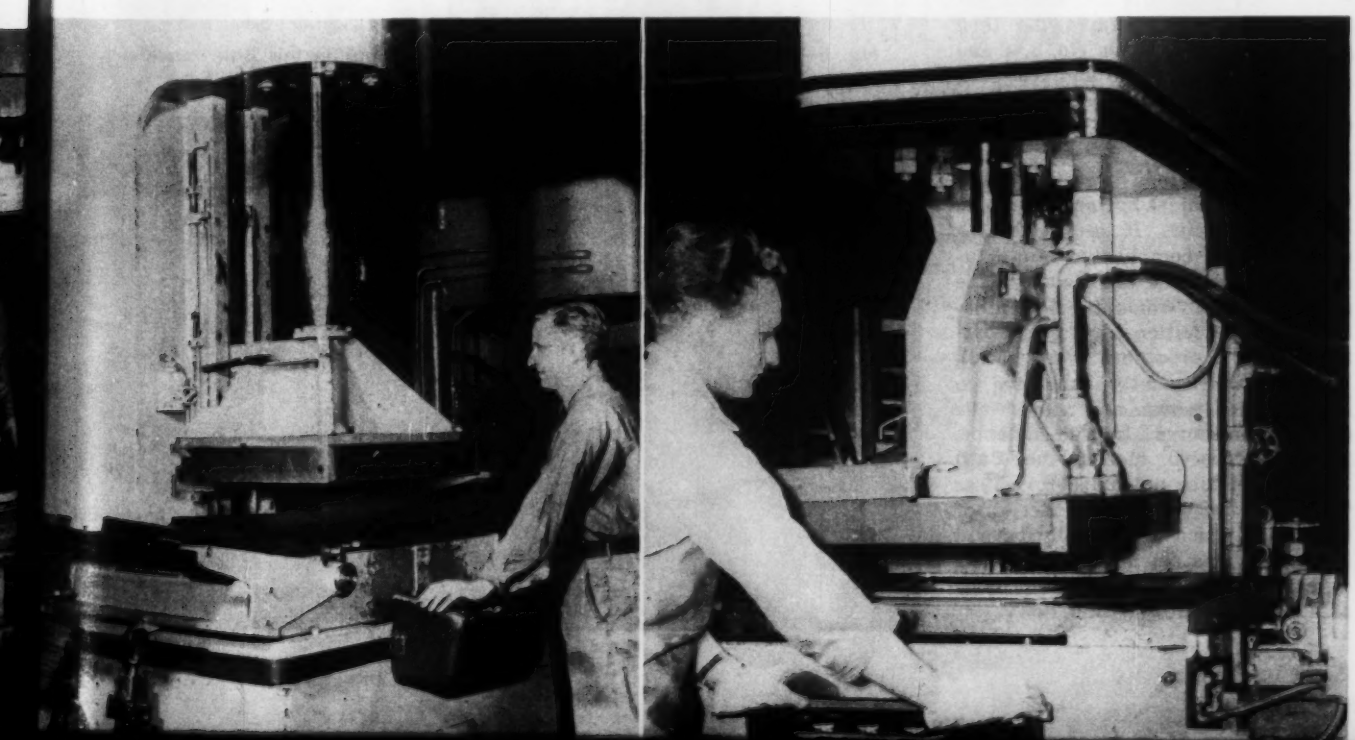
When the operator presses a button, the ram descends a distance of 26 inches to accomplish the folding or forming. It will be observed that the upper die has a sliding section at the rear. As the ram approaches its maximum travel, this section is forced backward to form the area of the cabinet beneath the flange. The finish-formed cabinet as removed from the Bath machine and uprighted stands about 37 inches high and appears as shown in the bottom portion of Fig. 1.

Eighteen Presses Available—Cabinet bottoms also made from 0.037-inch (20-gage) cold-rolled steel sheet, receive their first operations in the press room. Initial operation is a draw on one of the Cleveland or Danly mechanical presses of which there are eleven of the former ranging from 60 to 150 tons capacity, and seven of the latter ranging from 100 to 250 tons capacity. This is followed by a trimming and piercing operation, after which the pieces are stacked in gondolas. When a gondola has been loaded with 50 to 100 pieces, it is moved by an industrial truck into the fabricating bay adjacent to a second Bath machine for final forming.

Latter machine, like the first, is a self-contained hydraulic unit with vertical ram and self-actuating

Fig. 3—Cabinet sides and top are formed from the flat in this specially-designed Bath forming machine which is a self-contained hydraulic unit

Fig. 4—A series of six 90-degree bends are made on cabinet bottom on this Bath hydraulic forming machine equipped with self-actuating dies



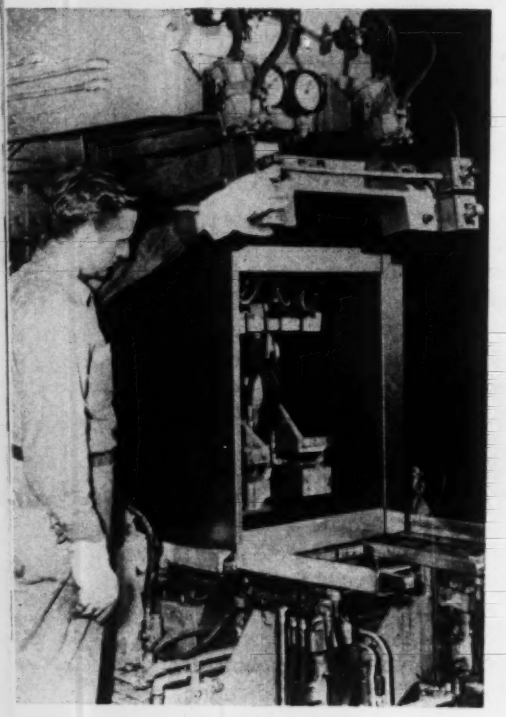


Fig. 6—Clamped in the jig of this National automatic welder, the two cabinet components are joined by 52 welds that are made in sequence

dies. Partially formed cabinet bottom is positioned in the die as shown in Fig. 4. When the operator sets the machine in motion by pushbutton, upper die descends through a 12-inch stroke to make six 90-degree bends. The bends are accomplished in five steps, Fig. 5, as upper die travel proceeds. First downward movement of the ram performs bends No. 1 and No. 2 simultaneously as the two sides are turned upward at right angles to form the piece into a U-shape. Internal rams in the upper die then make in sequence bends No. 3, 4 and 5 on the left-hand side and No. 6 on the right-hand side. A bottom finish-formed is illustrated at the top of Fig. 1.

With a three-man crew, this machine forms cabinet bottoms at a rate of 325 per hour. If press forming was used, four complicated cam-actuated dies would be required and the production rate would be slower because of the additional handling operations such a procedure would entail. Also, it is frequently expensive to turn vertical movements into dwells and side pressures. In this instance, the self-actuated die of the Bath forming machine not only proves less expensive but performs a series of operations which are literally beyond the press. This machine, therefore, is a most important element in Hotpoint's cabinet fabrication line.

The finish formed cabinets and bottoms converge in the production line at the National multispot welder shown in Fig. 6. The bottom is placed in the welding jig and the cabinet placed on top of it, back side forward. Hydraulic clamps hold the assembly together while 52 spot welds are automatically made in sequence. Between 7 and 8 seconds are required to complete the welding cycle on this assembly.

Finishing Operations Performed— Removed from the welding machine, the cabinet assembly is placed on a roller conveyor and moves to a station for a series of finishing operations such as grinding, dressing and cleaning of welds as required. The cabinet then is suspended on an overhead conveyor line, designated as the "A-paint line," to move to another area of the plant for surface treatment and finishing. Once on this line it is not removed until it arrives at the assembly line.

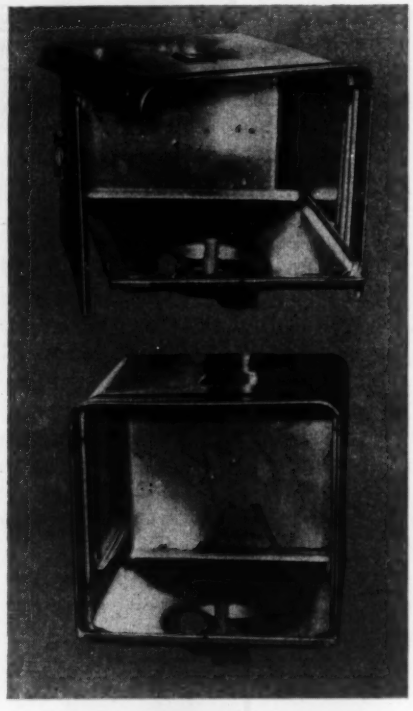


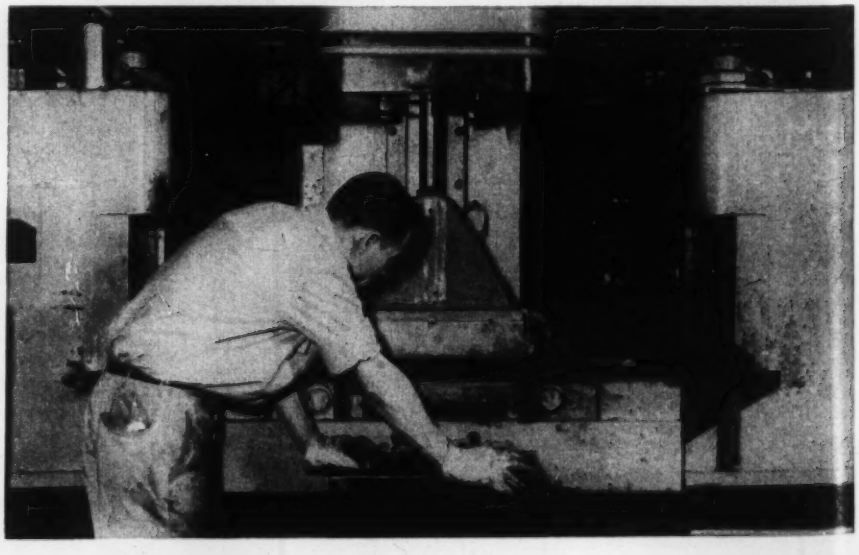
Fig. 7—Dishwasher tub consists of three parts—top, bottom, and sides and back, as shown at top. These parts as welded together are shown at bottom

In the paint department the conveyor carries the cabinet through a six-stage washing machine and a propane gas fired dry-off oven, after which a 19-minute cooling period follows. The cabinets next enter a booth for spray bonderizing and thence pass through another propane-fired oven for baking this coating. Entering a finishing booth, they are sprayed with synthetic enamel and move on into the baking oven. From here the conveyor delivers the enameled cabinets to their point of use on the dishwasher assembly line. Arriving at this point, the cabinets are taken off the paint conveyor and placed on a slat-type assembly conveyor.

Tubs for the dishwashers consist of three parts, namely, the tub top, bottom, and sides and back. These, made from 0.050-inch (18-gage) deep drawing enameling steel, are shown at the top in Fig. 7 arranged in their relative positions; the welded assembly is at the bottom. Tub tops and bottoms are formed complete in hydraulic presses in the press room, cam-actuated dies being employed for the most part. These parts are then trucked to the tub fabricating line.

The part constituting the tub sides and back is only partially formed in

Fig. 8—Tub sides and back undergo final forming in this Bath machine which employs three separate forming units



Don't let OVERSIZE VARIATION add to your steel cost

It's not "price per pound" that determines the cost of the flat-rolled steel you use in your product, but the cost per foot or per piece. When the strip thickness runs to the high side of the tolerance range, you get fewer feet per pound and, therefore, fewer units of production per ton. As a result, your steel costs go up. In effect, *oversize variation is a hidden charge — adds to your steel cost.*

Beat oversize variation — specify CMP Thinsteel, the trade name identifying precision cold-rolled strip steel in low carbon, high carbon (annealed or tempered) and stainless grades. Thinsteel accuracy to gauge insures maximum yield per ton and offers a definite means of reducing cold-rolled strip steel costs to the minimum.

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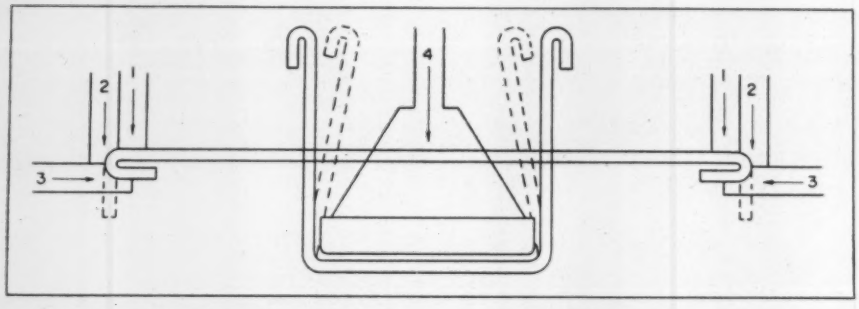


Fig. 9—This sketch details sequence of operations in forming dishwasher tub sides and back

the press room. Final forming operations are performed on a third Bath machine shown in Fig. 8. This is a self-contained hydraulic machine employing three separate forming units to make three major bends. The two outside heads contain forming slides which automatically and simultaneously form the curl and reverse lip of the extreme ends of the part. These slides actuate hydraulically, retract automatically and through sequence control, the center forming punch descends, making the two large radii bends with the assistance of wing-type rocker plates.

Slides Retract Automatically — Sketch shown in Fig. 9 implements understanding of the foregoing operations and their sequence. With a part placed on the table of the Bath machine and the pushbutton actuated, hydraulic slides No. 1 descend to serve as hold-down pads at each end of the piece; slides No. 2 move down to turn the edges 90 degrees; then slides No. 3 move in to turn the edges another 90 degrees and complete the reverse lip. All three slides retract automatically, after which the center forming punch No. 4 descends approximately 8 inches to make the large radii bends with aid of the wing-type rocker plates. In this latter operation, the part is formed U-shape. Downward movement of the punch in forming the radii causes the two sides to move toward each other but retraction of the punch restores parallel alignment or true U-shape.

Controls are provided and arranged so that the machine may be operated automatically or manually. Performing all three operations on automatic cycle, the equipment finish forms about 40 tub parts per hour.

When tub tops and bottoms arrive at the tub fabricating line by truck from the press room, they are placed on a table where the mounting brackets are welded on. These operations completed, they are passed along to meet up with the finish formed tub sides and back units transferred from the Bath machine.

This point is adjacent to the National electric seam welder, shown in Fig. 10, which has a fixture in which the three tub components are loaded. When the operator presses the start button, hydraulically-operated heads move in from either side to engage the fixture and clamp the parts together. Another pushbutton starts the automatic welding cycle. The tub assembly moves in horizontally under two wheel-electrodes; returns to the front, indexes 90 degrees and makes a second pass under the electrodes; again returns to the front, indexes another 90 degrees and then makes a third pass under the electrodes.

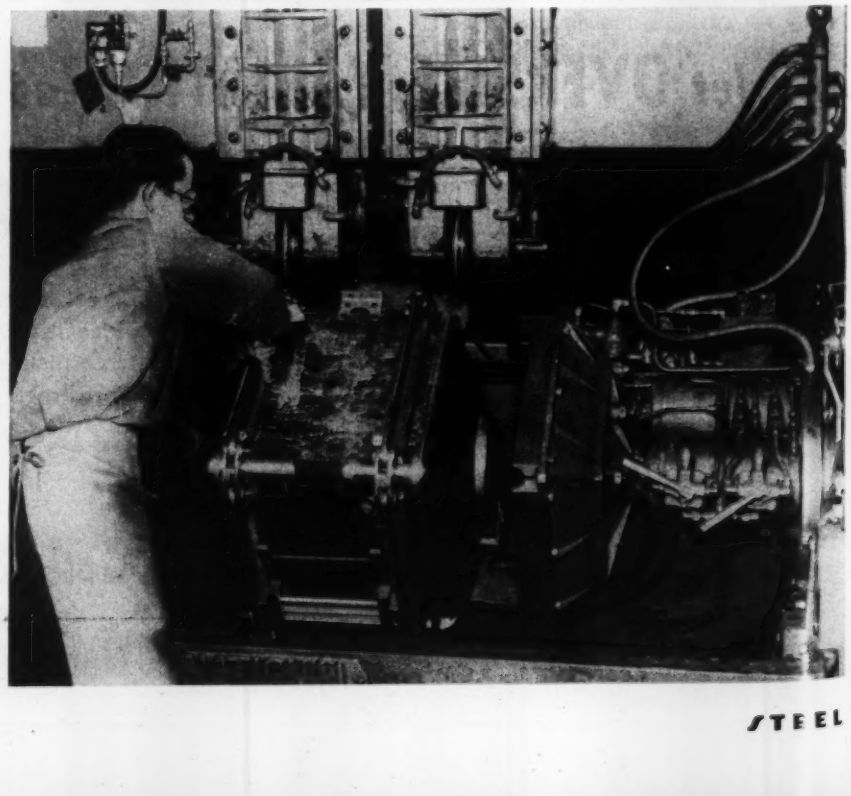
Material Vitreous Enameled—Removed from the welding machine, the tubs are transferred to a powered slat conveyor on which they undergo a series of manual gas and arc welds and metal finishing operations, namely, grinding, cleaning and dressing of the welds. The tubs are then hung on an overhead delivery conveyor which moves them to the vitreous enameling department.

At that point they are taken off the conveyor in the pickle room and loaded 12 at a time in a Monel metal basket suspended from a monorail. In this basket the tubs are subjected to cleaning and pickling operations which includes three alkali washes, a cold rinse, a hot rinse, two acid dips, a cold rinse, a hot nickel dip, two borax neutralizing dips and a final rinse. Following passage through a hot air drying station, the baskets are transferred to another monorail which takes them to an unloading area.

Removed from the racks, the tubs are dipped in ground coat and suspended on a conveyor which transports them through a dry-off oven. On the conveyor, the tubs pass through a booth where the ground coat on all edges is reinforced by an operator using a spray gun. They then are transferred to the burning furnace chain which carries them through a General Electric furnace maintained at 1850° F. Travel through the furnace requires 20 minutes.

Emerging from the furnace, the tubs are removed from the burning chain and placed on a pallet-type conveyor to receive the finish coat. This conveyor carries the tubs in sequence

Fig. 10—The three tub parts are welded together in this National automatic seam welder. Tub indexes and moves under the wheel electrodes in three passes



through a spray booth, a dry-off oven and a brushing booth. Suspended once more on the burning chain, the tubs re-enter the burning furnace for fusing of the finish coat. During the finish coat burning, furnace temperature remains the same as for the ground coat, and speed of travel is identical, thus this furnace provides a dual function.

As the tubs come out of the furnace, they are removed from the burning chain and transferred to a booth where an asbestos base material is sprayed on the exterior surfaces to serve as a sound deadening medium when the dishwashers are in use. Following this application, tubs are hung on the delivery conveyor which carries them back to the dishwasher assembly line. Here, following numerous assembly operations, the tubs meet up with the cabinets and are installed in the latter to emerge at the end of the line as complete dishwashers ready for shipment.

Standardizing Abrasive Grain

ALLOWABLE limits for the sizing of aluminum-oxide and silicon-carbide abrasives for polishing uses and for grinding wheel manufacturing are covered in simplified practice recommendation R118-45, abrasive grain sizes, which has been revised and made available for acceptance or comment by Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

Revision, proposed jointly by Abrasive Grain Association and Grinding Wheel Institute, provides two tables, one for sizing abrasives for grinding wheel manufacturing and the other for polishing uses. Appropriate changes are made in the sizing and limits of certain grit numbers to make them suitable for these needs.

Aiming at Cost Reduction

TO DETERMINE how advanced fastening methods could help reduce assembly costs, representatives of Prestole Corp., Toledo, O., met with department heads and members of engineering, drafting, tooling and cost-reduction divisions of Westinghouse Electric Corp., at that company's Mansfield, O., plant. Harold W. Kost, president of the fastening firm, pointed out that production men would be amazed at the number and weight of the fasteners used in the assembly of any given product. He described a recent case in which Prestolizing (see STEEL, January 23, 1950, page 55) successfully reduced the weight of a product by 11 pounds through more efficient fastening methods.

Manufacturers are licensed to use this process and, by setting up Prestole punches and dies in their own presses, thread-engaging impressions are formed directly into panels, brackets and other structural parts of their product. Conical in shape, these impressions are said to provide a full 360-degree grip on screws, bolts. Also on exhibit at the clinic were individual Prestole fasteners for use in locations not suitable for the fastening method. Some of these fasteners are welded into place, some snap into assembly position and others are applied by hand. The same conical thread grip is formed in these fasteners which are specially shaped to conform with the assembly requirements.

Simplifies Aluminum Plating

SAND castings, die castings and wrought aluminum may be processed during the same cycle using a chemical process which is said to eliminate pitfalls encountered in electroplating on aluminum. Called the Alumetex and developed by MacDermid Inc., Waterbury, Conn., the process is reported to eliminate blisters, pits and dull deposits on the finished product.

The same process is used for all common alloys of aluminum. It is reported that three years of tests at Harding Mfg. Co., Detroit, have shown excellent corrosion resistance and adhesion by the simple immersion treatment.

Oil Film on Tin Plate

Determined by new method which lends itself to rapid production line control

DETERMINATION of the amount of cottonseed oil on any spot of electrolytic tin plate within 5 minutes after the plate is produced has been made possible by a new test method. When desired, a complete picture of the oil distribution edge to edge, and top to bottom, may be completed within 30 minutes.

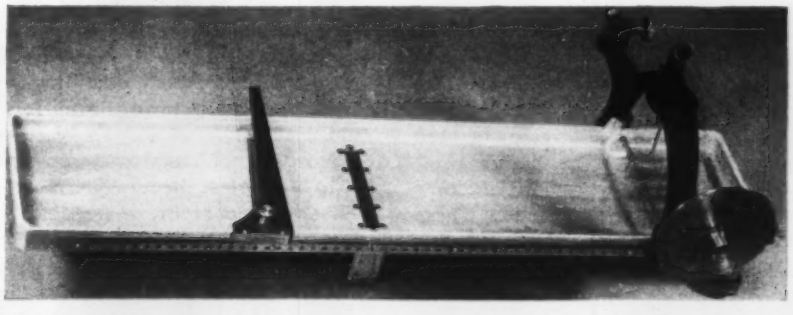
Details of the method, which was developed in the laboratories of the Carnegie-Illinois Steel Corp., Pittsburgh, were presented recently in *Analytical Chemistry* by J. G. Donelson and R. A. Neish. The procedure has been found to offer better means for production control than is possible by the solvent extraction method.

The method of determination is based on the modification of the tray of a hydrophil balance to permit the complete vertical immersion of samples of tin plate in the water filling tray. The oil film on the tin plate is transferred to the water surface by repeatedly dipping the sample into the water. The amount of oil transferred is then measured by the usual surface balance technique.

A large part of the tin plate produced by the continuous electrotinning process is lubricated with edible grade cottonseed oil, either by spraying with an emulsion or by electrostatic precipitation from an atomized mist. According to Donelson and Neish, the preferred amount of oil is 0.20 ± 0.05-gram per base box. A perfectly oriented cottonseed oil film of such a weight is equivalent to about five molecular layers on each surface of a plate.

The hydrophil balance procedure is applicable regardless of whether the oil is applied to the tin plate by emulsion oiling, electrostatic oiling, or by other means.

The method should be used only for freshly produced tin plate. Rapidity of the method makes it particularly useful for continuous production line control.



Modified hydrophil balance for determining oil film on tin plate

STEEL ENGINEERS REPORT ON LATEST PRODUCTION METHODS

Digested here are papers presented at the spring meeting of Association of Iron & Steel Engineers in Birmingham April 3, 4

RECENT developments in iron and steelmaking—from iron ore to the finished products—came in for review at the annual spring conference of the Rolling Mill Committee, Association of Iron & Steel Engineers. The conference, held at the Tutwiler Hotel in Birmingham, Apr. 3 and 4, attracted 700 engineers and operating men.

The big differences in blast furnace practice between the North and the South are brought about by the variations in analysis of the ores used. This was emphasized by C. G. Hogberg, assistant to the chairman of the blast furnace committee, United States Steel Corp., in a paper entitled **"Technical Aspects of Northern and Southern Blast Furnace Practice."**

More Iron in Northern Ores—A typical Mesabi ore will contain better than 50 per cent natural iron, compared with about 36 per cent natural iron for ores mined in Red Mountain in the Birmingham district.

The fact that Birmingham ores contain fairly large amounts of lime in combination with acid gangue does not justify a comparison on the basis of iron content alone. However, despite the lime content, blast furnace practice in the Birmingham district is characterized by slag volume in excess of 2000 pounds per ton of iron, compared with 800 to 1200 pounds in the North.

Requires More Coke—The high-slag burden in Birmingham practice has a marked influence on thermal requirements, and increases the coke consumption rate. This increase in fuel rate appears to be equivalent to 60 pounds of typical coke per 100 pounds of slag. Because of the higher fuel requirement, higher blast rates are necessary for satisfactory iron production performance. These higher blast rates are made possible by sizing of ores through screening and agglomerating the fines. To compensate in part for the higher blast rates and higher fuel requirement in the South, the furnaces must be provided with more generous proportions of working volume relative to hearth area than is required for Northern furnaces.

Mr. Hogberg further stated that the question of slag voume has recently assumed new importance because of the consideration of taconite concentrate and high grade imported ores.

Choice between these materials and high silica direct-shipping domestic ores must be in part determined by application of the factor designed to express the equivalence between slag and the coke required to melt the slag.

Many Factors To Consider—When confronted with this problem, the metallurgical engineer faces a bewildering array of available factors, ranging from a ratio of two-tenths of a pound of coke per pound of additional slag, and up.

One cannot leave the subject of stock flow in the blast furnace without mention of the problem of high blast temperature, particularly in conjunction with the fine Mesabi ores.

The general inability to economically apply high blast temperatures when operating with low coke rates in the production of basic iron is probably the result of a sharp increase in basicity of the primary bosh slag due to reduction of more silicon into the iron combined with lowering of the zone of fusion, the subsequent increased blast pressure and a regular stock movement. This is no doubt aggravated by an increase in the differential between the temperature of the bosh lining and the descending stock, resulting in a greater tendency toward scab formation.

Prospect of improved operation with high blast heat as a result of deliberately carrying more acid bosh slag together with yet steeper bosh angles is intriguing, and one which will no doubt assume greater importance as more pressing current problems in raw materials beneficiation approach solution.

Blooming Mill Practices

D. W. Lloyd, general superintendent, Brier Hill Works, Youngstown Sheet & Tube Co., in his paper entitled **"Modern Blooming Mill Practices"** stated that seams or laps can occur as a result of poor practice during almost any phase of processing. Identification of their source may require macroscopic, microscopic, or even experimental procedures. Defects incurred by poor heating practice are usually identified by visual inspection of their characteristic appearances.

Problem of surface failure due to steelmaking practice is one of steel cleanliness, oxidation practice, sulphur reduction and pouring pit practice. Elimination of these sources of defects is most difficult to accomplish and usually requires a considerable amount of experimental work.

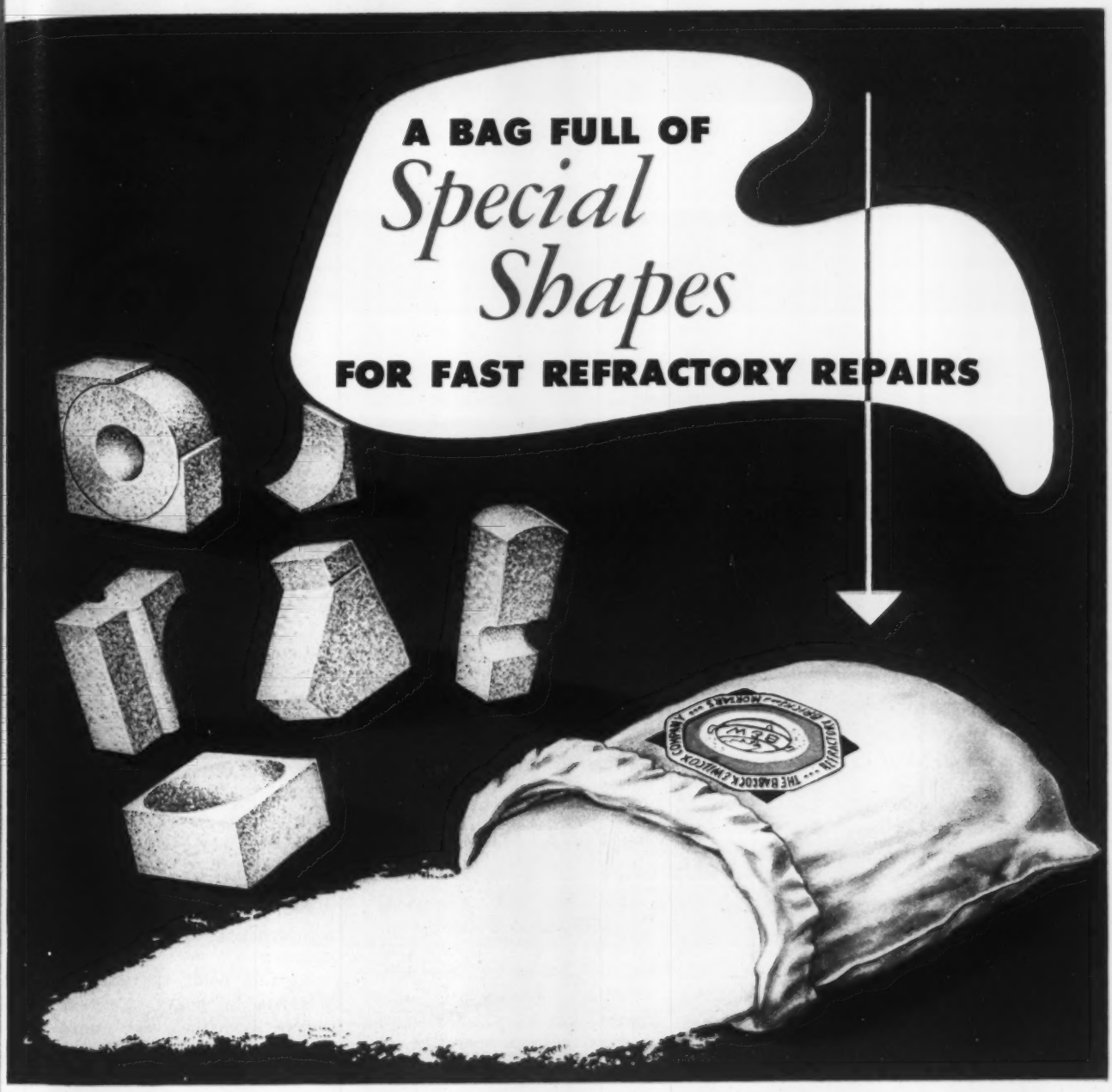
Seams, laps and cracks, as produced by rolling mill practice, are the result of incorrect pass design, mill or guide alignment, overdraft, underdraft and similar mechanical irregularities. Close inspection and supervision can minimize the occurrence of these defects.

Requires Co-operation—Overall reduction of surface defects requires close co-operation between open hearth, rolling mill, conditioning yard and metallurgical departments. It is a problem involving more rapid intensification of defects as to their source and training operating personnel to recognize them, so that corrective measures can be taken without delay.

He further stated that the most pronounced segregation in steel is caused by sulphur, phosphorous and carbon. Zones enriched by these elements can be found especially near blow holes. Sulphur and phosphorous segregation or banding cannot be eliminated, even by prolonged normalizing. However, with sufficiently high temperatures and sufficiently long heating times, the carbon content, because of its high degree of diffusivity, will show a distribution more uniform than that of sulphur or phosphorus.

Electric Welding Pipe

J. H. Middleton, chief metallurgist, Southern District, Republic Steel Corp., in his paper entitled **"Manufacture of Electric Fusion Welded Pipe"** revealed that the various steps in the manufacturing process are basically the same for all diameters and wall thicknesses. These steps



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can be grouped into three general divisions: 1. Preparation of and formation of the flat plate into cylinders; 2. the welding; and 3. the sizing and finishing of the pipe.

He described in detail the mill built by his company for the manufacture of expanded steel line pipe. Outside diameters range from 20 to 30 inches with wall thicknesses of ¼ to ½-inch in lengths from 27 to 31 feet 6 inches.

Use Submerged-Arc Process — Seam welds on the pipe are made by the submerged-arc process. The outside seam is welded at a point 24 inches ahead of the exit end of the welding cage. This affords about 24 inches of travel for the deposited metal to cool and grow strong. Welding is done by using twin arcs, one ac and the other dc. These arcs are about 1¼ inches apart. The dc arc, known as the leading arc, makes the first contact with the seam. Welding speeds of approximately 48 inches per minute are used, depending on the pipe's wall thickness.

Annealing Tin Plate Requires Controlled Atmospheres

A. R. Trimble, assistant manager, department of metallurgy, inspection and research, and J. E. Hill, metallurgical engineer, sheet and tin mills, Tennessee Coal, Iron & Railroad Co., in their paper entitled **"Some Aspects of Annealing Atmospheres for Tin Plate Strip in the United States"**, revealed that during the past two decades the importance of controlled atmospheres for use in the annealing of steel for tin plate has grown to where such use is not only a necessity in the annealing process but also is an important factor in determining the ultimate quality of the tin plate produced.

Introduction of Deox gas, the product of partial combustion of fuel gas, was a marked improvement over the use of raw fuel gases. Deox gas has been by far the most widely used protective atmosphere in the annealing of tin plate strip up to the present time. Today, there are other protective atmospheres in use in the annealing of tin plate such as lean gas and nitrogen-hydrogen gas.

Parallels Growth of Cold Reduction—Growth of the use of controlled atmospheres for annealing tin plate parallels the application of the cold reduction process to tin plate strip. This phenomenal increase may be expressed in many ways, but is best illustrated by tonnage comparisons. During the past 20 years, the annual tonnage produced has increased from a few thousand to approximately 5 million tons today.

The problem of increasing the corrosion resistance of tin plate is of much interest to tin plate producers, can manufacturers, packers, storekeepers and the housewife. The problem has been critical during the past decade because of wartime restrictions on the use of tin. Now the tin supply has been built back to above prewar levels and governmental restrictions removed, but the search for a way to increase the corrosion resistance of tin plate is still of paramount importance to canmaker and tin plate producer.

Rapid Tests Sought—Since it takes months to determine the corrosion resistance of tin plate by the pack test, considerable interest has been shown in a test for more rapid evaluation of this factor. Much work has been done and many things have been tried, only a few of which include potential measurements, immersion of samples for given periods in various food media, and controlled measurement of hydrofluoric acid attack. The more promising of these tests are under constant study as the perfection of a dependable rapid test will prove to be of inestimable value to the tin plate industry.

Blooming, Bar, Billet Mills at Lorain

A. F. Eisel, chief roll designer of United Engineering & Foundry Co., in his paper entitled **"Recent Developments in Blooming, Bar and Billet Mills"** described the new No. 4 blooming, bar and billet mills which recently were put in operation at the Lorain Works, National Tube Co., which concluded a large postwar improvement and development program. He described the improvement highlights giving particular emphasis to the six-stand and four-stand continuous mills.

The 46 x 100-inch two-high reversing blooming mill is equipped with front and back tables, individually driven feed rollers, double rack-type manipulators with tilting fingers on both sides, and hydraulic roll-changing rig.

Use Oil-Film Bearings—Rolls are equipped with oil-film bearings which, to the speaker's knowledge, was the first application of this type on any blooming mill.

Top roll is hydraulically counterbalanced and operated by two motor roller bearing screw-down with mechanical and Selsyn roll opening indicators.

Rolls are driven directly through universal spindles and couplings by two 4000-horsepower 40 to 80 rpm reversing dc motors. Collar diameter of rolls is 46 inches with a 100-inch body containing 34, 20, 15, and 18-inch passes 3⅞ inches deep. The roll design thus avoids the common practice of too much open bullhead work tending to sharpen corners.

Avoids Corner Cracks—By confining the majority of reductions in grooves with large radii, blooms are comparatively free from corner cracks and seams. This unit rolls a 32½-inch square ingot to 15-inch square blooms in 17 passes which is delivered by the mill run-out table to a shear situated in line 145 feet from the mill.

After cropping, the 15-inch bloom is delivered to a 38 x 96-inch two-high reversing bar mill situated in line, 206 feet from the shear. The unit is utilized as a secondary mill to further reduce the 15-inch bloom to 9 x 8 inches or to various large tube rounds. This second mill is similar in construction to the 46-inch mill containing all of its features with the following exceptions. It is driven by one 5000-horsepower 65 to 130 rpm reversing dc motor through a 38-inch pinion stand.

Feed Rollers Eliminated — Feed rollers have been eliminated, these not being necessary due to longer bloom lengths received from the 46-inch mill. A double carriage hydraulic roll changing rig has been provided to facilitate fast roll changes.

At this point the speaker called attention to the flexibility of operation between these two mills. While normal operating practice calls for a 15-inch bloom from the bloomer to the bar mill, the 46-inch mill is required to roll at various intervals smaller sizes down to 9 x 8 inches. These may be rolled, cropped, and sheared to required length and removed by transfer car to bloom yard. These operations may continue while rolling a 15-inch bloom in the bar mill to 9 x 8 inches or a large round, such blooms having been previously received in the 46-inch mill. Or, in the event of a breakdown or roll change in the bar mill which normally supplies a six-stand continuous mill, the 9 x 8-inch bloom may be rolled on the 46-inch mill, cropped and sheared to required length, then transferred to an auxiliary roller table in line with the continuous mills, thus, by-passing the bar mill entirely.

Straight-Flow Line — All large rounds are rolled direct in a straight-

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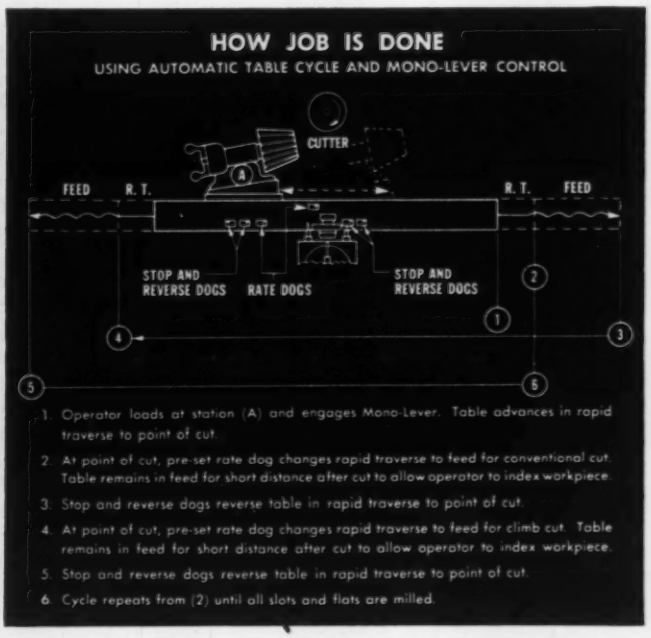
HOW JOB IS DONE
USING AUTOMATIC TABLE CYCLE AND MONO-LEVER CONTROL
CUTTER
FEED
R. T.
R. T.
FEED
STOP AND REVERSE DOGS
RATE DOGS
STOP AND REVERSE DOGS
1. Operator loads at station (A) and engages Mono-Lever. Table advances in rapid traverse to point of cut.
2. At point of cut, pre-set rate dog changes rapid traverse to feed for conventional cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
3. Stop and reverse dogs reverse table in rapid traverse to point of cut.
4. At point of cut, pre-set rate dog changes rapid traverse to feed for climb cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
5. Stop and reverse dogs reverse table in rapid traverse to point of cut.
6. Cycle repeats from (2) until all slots and flats are milled.

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flow line thus, from ingot through bloomer, through bar mill, to saws for cropping and cutting to required lengths, continuing on to shipping tables.

If the 9 x 8-inch bloom is delivered from the 46-inch mill, it must bypass the bar mill. Therefore, a scarfing machine has been mounted on rails for convenience in shifting to a position suitable for either operation. Following the scarfing, cropping and dividing operation, the 9 x 8-inch bloom enters the six-stand mill. This modern unit represents one of the major developments in rolling operations inasmuch as it embodies many features uncommon to billet and bar mills. It is also unique in that it resembles and contains many features common to the hot-strip mill plus several additional developments designed to promote flexible rolling operations.

Produces Variety of Products—Designed to produce a wide variety of semifinished products from 9 x 8 inch blooms, the mill is equipped to roll 4 x 4-inch, 5⅝ x 4-inch, 7 x 4-inch, 8 x 4-inch, 9 x 4-inch, and 4¾ and 5½-inch tube rounds in the same roll and guide setup with the ability to alternate quickly on any of the above sizes by pushbutton control. Additional skelp slabs up to 12 inches wide may also be rolled on the same setup from 12 or 14-inch slabs received from either the bloomer or bar mills.

The mill consists of three vertical roll stands Nos. 1, 3 and 5 and three horizontal roll stands Nos. 2, 4, and 6 set in tandem on 10 foot centers. Each stand is powered individually by a 1750-horsepower dc motor of 300 to 600 rpm, making a total of 10,500 horsepower for the six stands. Suitable gear reduction units provide for a finishing speed of 346 to 692 fpm at No. 6 stand.

Rugged—All vertical mills are of sufficiently rugged construction to enable drafting equal to the horizontal stands. The main vertical housing containing two 30 x 48-inch rolls is a self-contained integral unit and resembles a horizontal stand laid over on its side. A fixed outer roll held securely by hydraulic pressure against the housing seat, and a movable inner roll hydraulically balanced against motor-driven screws, plus antifriction roll neck bearings and thrust units, comprises the roll adjustment. Screw speeds of 6 inches per minute with sufficient travel permits operating roll centers from 35¾ to 27¼ inches.

The four-stand continuous mill is similar in design and contains all the features of the six-stand mill. This mill comprises four roll sets in tandem, V-1 vertical, H-2 horizontal, V-3 vertical and H-4 horizontal. Each set is powered individually by a 1250 horsepower dc motor of 400 to 800 rpm, with reduction gear drive designed for a finishing speed of 430 to 860 fpm. All mill rolls are 20 x 36 inches and at the present time are designed to produce 3¼ and 3¾-inch rounds and 2½-inch square billets with sufficient available space for other sizes.

Roller vs. Friction Guides

C. S. Lambert, superintendent of merchant mills, Campbell works, Youngstown Sheet & Tube Co., in his paper entitled **"Roller Guides"**, stated that the advantages of substituting rolling contact for sliding contact are: Sliding friction is replaced by rolling friction, wearing surfaces have negligible relative motion with contacting surfaces, wearing surfaces (rollers) can be replaced or reconditioned without difficulty, and revolutions of rollers afford a means for directing a cooling water stream in such a manner as to impinge on roller surfaces immediately after contact with hot bars. Substitution of roller twist guides for friction guides has remedied serious surface quality difficulties, particularly in the case of special requirement steels.

It has been found advantageous to apply rollers as antifriction surfaces in entry side guards, delivery side guards, table side guards and table sweeps.

Many Savings—The potential of the extent of the use of rollers in guide equipment is limited only by practical considerations and justified on the basis of increased production, improved quality and savings. Repeaters and twist troughs have been built with multiple rollers spaced regularly on the guided path.

Most important development in roller guides has been the adoption of roller entry guides throughout a large portion of the industry for the rolling of rounds and hexagons. In the rolling of guide rounds, it has always been the function of the entry guides to lead the bar to the paths and to hold the oval leader with the major axis vertical. Whether the guides are roller or friction, this is accomplished by providing a means of moving one guide element so as to provide clearance for the bar to enter between the guides. Thereupon, the guides are brought together with pressure bearing on the bar. The guide boxes that operate in this manner are known to the industry as screw or wedge boxes.

Bearings Essential—Ball or roller antifriction bearings are essential to the successful operation of roller entry guides. Life for either type is about the same. The taper roller-type offers the advantage of using the guide roller as an outer race. Ball bearings, on the other hand, are available from many suppliers in the same size. This is an advantage in times of national emergency. Dirt seals and an adaquate method of lubrication promote bearing life.

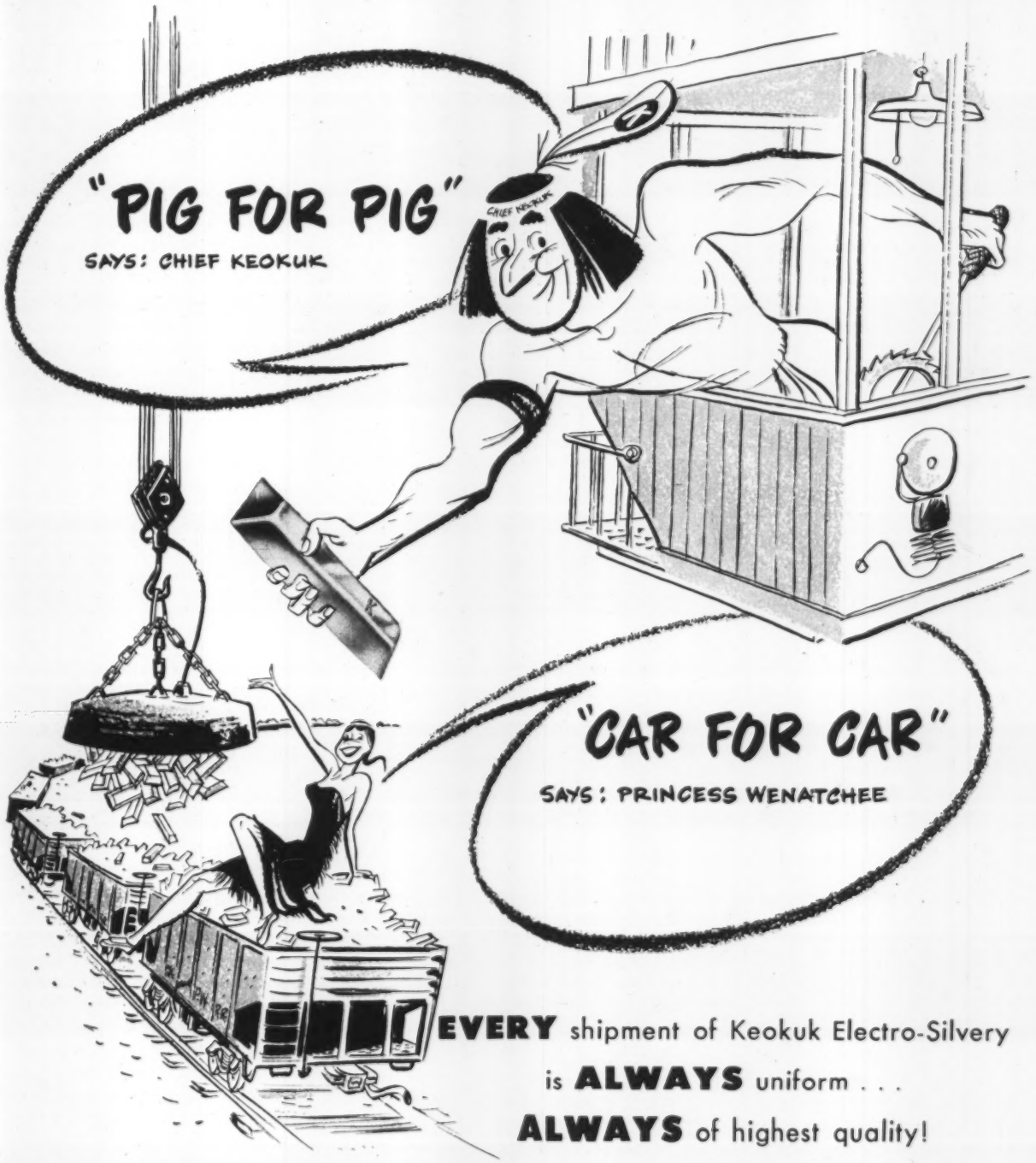
Roller guide equipment, by nature of its more delicate mechanical design, must have the attention of a skilled mechanic. Careless procedures will not do. Good housekeeping and careful maintenance work is the only assurance for dependable, delay-free operation. It is customary to assign a member of the mill crew to a position of "guide man". In this capacity he maintains the guide equipment of one or more mills. He may also be the supervisor of a guide shop.

Exceed Theoretical Angle—In the design of roller twist guides, the angular pitch of the rollers must be calculated to produce the desired degree of twist. The angular displacement, theoretically, is easily reduced to units of degrees per foot. Thus, the angle of twist obtained between the rolls and guide will be reproduced proportionally on delivery from the guide rollers. However, in actual practice, it has been found better to exceed the theoretical angle slightly. Thus, an opening and closing movement of the rollers may be used to control the twist beyond and short of the theoretical angle.

How Keystone Boosts Rod Mill Output

William Herman, superintendent, rolling mills, Keystone Steel & Wire Co., describes his organization's rod mill in his paper entitled **"Nineteen Stand Rod Mill of Keystone Steel & Wire Co."** He stated that their mill is a 19-stand unit having two loops. This is a fairly common arrangement but the outstanding difference lies in the fact that there are only two bars in the first nine stands and as many as four bars in the last 10 stands simultaneously, with an average of three bars continually. It is common practice to three-strand a mill to increase tonnage, but when this is done, it is three-stranded from the first to the last stand, which will never give quite three bars continually. Due to the crop at the flying shear and the gap in feeding the billets into the mill, the result will be something less than a three bar average.

(*Please turn to Page* 116)



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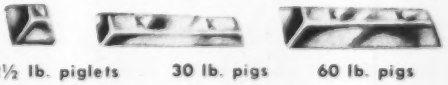

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"PR" Plating

(*Continued from Page 88*)

coating thickness than the more recessed or inner portions. In PR plating, when the current is reversed more metal is stripped off the outer edges and protruding areas. As a result, a piece such as a bumper may have a uniform deposit over its entire surface, with a maximum difference from the edges to the center of 10 to 20 per cent. This uniformity of deposited coating results in an appreciable saving of metal and an improved finish. Obviously, the thinnest portion of any surface determines its corrosion resistance, and the minimum thickness is no less with PR plating than with other methods.

In the past the most widely employed bright-plating method utilized commercially has been that of adding complex organic compounds, as previously mentioned, to produce a refined grain structure. A major disadvantage of this procedure is brittle deposits. In the PR process with inorganic constituents, considerable grain refining is obtained, and the resulting deposit is ductile and has unusual physical properties.

Other methods of current manipulation have been offered over the past 40 years; however, none of these has found commercial applicaiton. The two methods receiving the most attention were the application of a superimposed alternating current and the application of a pulsed direct current. Both of these methods were patented as far back as 1906. However, no commercial application of any consequence has persisted.

Applied to Various Metals—The PR-current process applies to other metals as well as copper. Brass deposits can be secured with 100 per cent plating efficiency in comparison with the 50 to 70 per cent normally obtained; pilot lines are now being constructed for plating wire and sheet. Silver and zinc are also being commercially plated with PR. A new process for nickel plating will soon be introduced. Chromium is the only metal that has not responded to the PR process, probably because in this method the part being plated becomes the anode for a portion of the cycle; chromium anodes cannot be employed because of their excessive solution rate compared to their low deposition rate.

Probably the main limitation of the PR process is the increased current required because of the stripping portion of the cycle. Additional equipment is also necessary, but this has not been a deterrent.

Elimination of Organic Addition Agents—In the early application of the PR-plating process, it became evident that if widespread commercial use of the process was to be made, better addition agents than the then-common organic compounds must be found. The difficulties encountered with the organic addition agent included: (a) A solution control problem—the analysis of the organic constituent was indefinite; (b) at high current densities rough deposits occurred; and (c) deposits were nonuniform due to decomposition products and nonuniform addition agents.

One possibility of improving the process appeared to be the elimination of the organic addition agents; however, the PR process by itself did not offer sufficient grain refining to give the high luster required for bright finishing. When the metallic inorganic addition agent was developed, increased grain refining was secured. The reason for this has not been definitely established; however, there are indications that the metallic portion of the inorganic compound precipitates at the inner-face between the part being plated and the solution adjacent to it. This forms a screen that prevents the formation of large crystals, and is conducive to more small crystals.

Since the plating solution is free from organic addition agents, it can be maintained free from extraneous organic constituents, which enter by such means as drag-in from the cleaning solution, dropping into the solution from the mechanical equipment, or as contamination in the plating salts employed. Cyanide copper baths containing the new inorganic addition agent can be treated continuously with activated carbon to remove this type of impurity. The results are a more uniform, high-quality deposit than has previously been secured. In general, this inorganic addition agent can be employed in all of the commercial cyanide copper-plating processes. The composition of the three most widely employed solutions used at present for copper plating is shown in table below.

Conversion of Existing Baths—One feature of the new process for copper plating is that any cyanide solution presently operated with organic addition agents can be converted without any major shutdown of the plating line. In the past when the organic constituent was changed, a great deal of difficulty was encountered. The procedure employed to convert to the Wes-X solution is merely to treat with activated carbon and correct the solution to one of the formulas in the table. If the solution is to be employed continuously, most of the benefits can be secured on a graduated basis if the bath is continuously filtered through activated carbon. One 28,000-gallon tank has been converted in this manner.

However, if convenient, a better method is to remove the solution from the plating tank and treat it all at once with activated carbon. The benefits are then derived almost immediately. Some organic compound will remain in the bath for as long as a month because all organic constituents are not removed by activated carbon. These remaining constituents will be plated out in the deposits in the first few weeks of operation. During this transition period, if the Wes-X addition agent has been added the solution operates on a continually improving basis with resultant saving.

Most organic addition agents cost from 6 to 12 cents per pound of copper deposited. If the cost of purification with carbon and the loss due to poor quality are included, the expense is actually much greater. The cost of Wes-X averages from 2 to 4 cents per pound of copper deposited. Also, this addition agent does not decompose under electroplating conditions and is readily controlled by analytical procedure.

Acid Copper Replacement — A strong tendency has been evident in the past few years to replace cyanide copper-plating solutions with acid copper-plating solutions. The depos-

RECOMMENDED SOLUTION COMPOSITIONS

Process Variables	Optimum	Limits
Copper as metal	8.0 oz/gal	7.5 – 9.0 oz/gal
Free potassium cyanide	1.0 oz/gal	0.8 – 2.0 oz/gal
Potassium hydroxide	5.0 oz/gal	4.0 – 6.0 oz/gal
Wes-X	0.8 oz/gal	0.5 – 1.0 oz/gal
Temperature	180° F	170–190° F
In the event that the solution is to be a sodium bath instead of potassium, the only changes are in the metal concentration and hydroxide concentration.		
Copper as metal	11.5 oz/gal	11.0 –12.0 oz/gal
Free sodium cyanide	1.0 oz/gal	0.8 – 2.0 oz/gal
Sodium hydroxide	4.0 oz/gal	4.0 – 6.0 oz/gal
Wes-X	0.8 oz/gal	0.5 – 1.0 oz/gal
Temperature	180° F	170–190° F
Another satisfactory solution is a Rochelle-type bath of the following composition:		
Copper as metal	6.0 oz/gal	4.0 – 8.0 oz/gal
Free sodium	1.0 oz/gal	0.8 – 2.0 oz/gal
Sodium hydroxide	2.0 oz/gal	1.0 – 3.0 oz/gal
Rochelle salt	5.0 oz/gal	4.0 – 6.0 oz/gal
Wes-X	0.8 oz/gal	0.5 – 1.0 oz/gal
Temperature	180° F	140–180° F

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+ .0000" } for hole size
− .0002" }

FOR PRODUCTIVITY?

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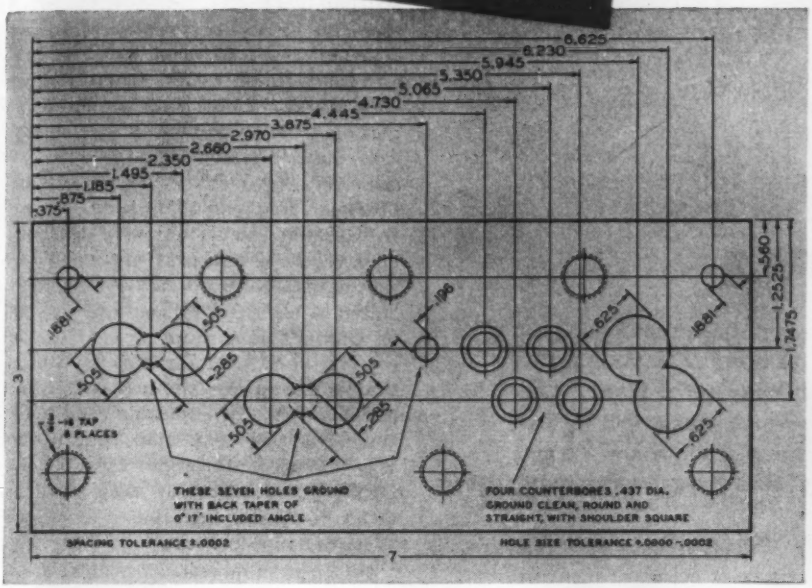

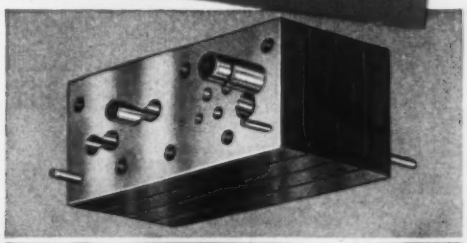

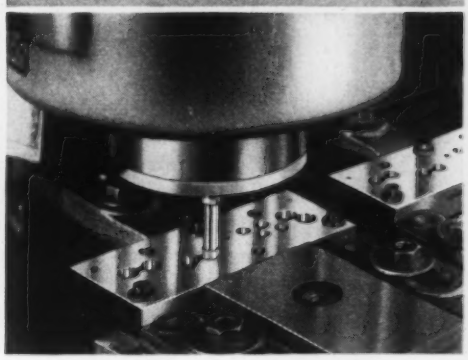

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Above: Hardened steel dies setup 4 in line. 15 holes ground in each die to tolerance of ±.0002" for spacing; +.0000", −.0002" for hole size. Job completed with 53% time-saving. P&W precision was demonstrated by stacking dies and plugging through with four .0002" undersize plugs. They checked in all 192 possible four-gage combinations.

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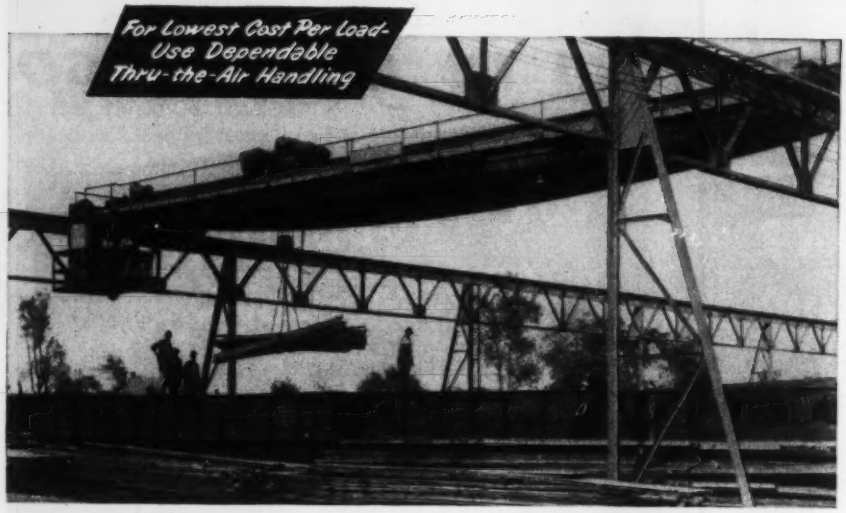

This installation required built-up plate, welded box construction . . . fish-belly design . . . enclosed cab . . . complete weatherproofing . . . main and auxiliary hoist units (see illustration below).

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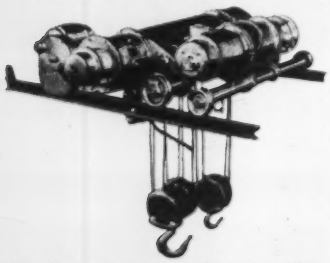
When you buy a crane, make sure you select the machine best qualified to do *your* job! The work for a crane in your plant probably differs from that in your neighbor's plant. The general crane rating and other details which are perfect for his handling problems may not be at all suitable for yours. To get the most crane for your money, let *crane duty* determine *your* choice.

It isn't entirely a matter of capacity. Travel speeds, hoisting speeds, frequency of use—all call for special consideration in the choice of a crane. That's why it's wise to discuss your problem with a Shepard Niles specialist. It's much less costly to install the *right* equipment in the beginning—than to make important changes later.



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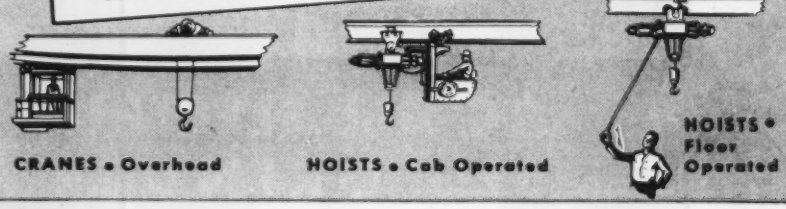


358 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

its from the latter process in general are not as high quality as those secured from the commercially employed cyanide process; however, the acid-plating bath costs approximately one third as much. In addition, there is little problem in the disposal of plating-room wastes with the acid process. In spite of these advantages, with the advent of the PR and Wes-X copper-plating process, this tendency has been reversed.

Since it is now possible to plate with speeds two or three times greater than with the acid-plating process, and to secure greatly improved deposits, the factors of solution cost and disposal of wastes are tolerated with a new overall cost reduction in plating. Several acid copper solutions have already been converted to the Wes-X cyanide copper-plating process. In these acid-plating tanks, the original solutions were less expensive; however, four organic addition agents were necessary. This resulted in a cost of 12 cents per pound of copper plate shipped. Also, the rejects due to nonuniformity more than made up for the cost difference between the two plating solutions. When 30 per cent more production was secured through these same tanks, little difficulty was encountered in justifying the use of the Westinghouse process.

Physical Properties—Physical properties of an electrodeposit are equally, or possibly more important than the physical properties of structural metal parts. Electrodeposited parts may be formed or drawn after plating, and yet they must retain high quality. In addition the actual service of some parts, such as automobile bumpers, puts heavy requirements on tensile strength and hardness of the surface.

Tensile strength of cyanide copper-plated deposits in the past was about 30,000 to 40,000 psi. Some acid-copper deposits have been made with a tensile strength as great as 80,000 psi, and with hardnesses of 130 to 160 Vickers. However, this condition was secured only through the use of large quantities of organic constituents such as glue and molasses. In any event, when this high tensile strength was obtained, the elongation was generally below 1 per cent, and the deposits were very brittle.

In an initial exploration of the physical properties of the PR cyanide copper-plated deposits, the tensile strength varied between 100,000 and 110,000 psi, with an elongation of 9 per cent. The deposits were ductile and varied in hardness from 200 to 220 Vickers. No evidence has been uncovered in any literature or at the

National Bureau of Standards of any previous copper deposits with such unusual physical properties.

Applications—Physical properties such as these have aroused the interest of the printing industry, the phonograph recording industry, and the wire industry. Initial applications have been made in all these fields, plus several others.

Decorative—There are two possible approaches to the decorative plating of steel parts such as home appliances and automobile trim. The first is to utilize the maximum rate of deposition with little regard for color, in the event buffing is to be done. A typical PR cycle for this type of processing would be 15 seconds plating and 3 seconds deplating.

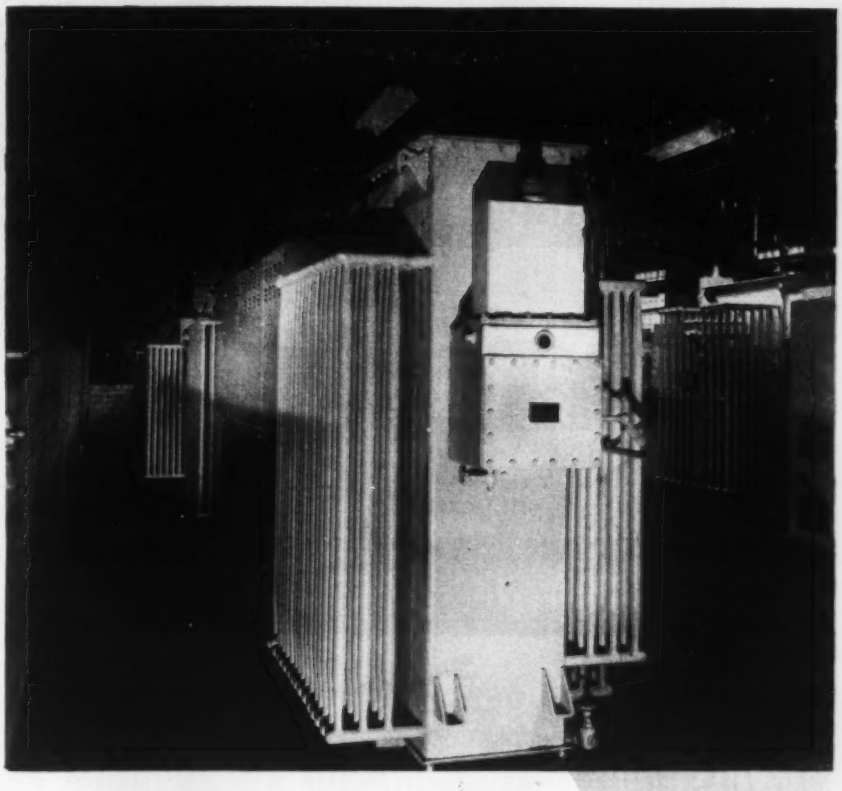
The other system, which will be employed more generally with the more widespread use of PR plating plus Wes-X, is to use as high a grade of steel as possible, do some polishing in the flat if production is high enough, stamp and form parts, deburr them, then deposit the required amount of copper by the PR process, and plate bright nickel and chromium. This produces a finished part without any intermediate polishing or buffing whatsoever.

An example of this type of finishing is shown in the automatic washing machine door in Fig. 5. Steel employed was not particularly smooth before finishing, as shown in Fig. 6. However, after copper plating, the part was sufficiently bright so that no buffing was necessary. The PR cycle for this work is about 20 seconds plating, 15 seconds deplating.

Flatiron covers are also finished by the same process, Fig. 7. A considerable saving per cover was realized in this application. All buffing except one simple coloring operation was eliminated. An auto parts manufacturer in the Detroit area was able to free 30 men in the buffing department for other work upon the introduction of PR and the new cyanide copper-plating solution.

Printing—In the printing industry a number of applications are now being tested. Printing plates have been made with a 0.006-inch layer of PR copper on the surface. Indications are that these plates etch better and last longer in production. Several rotogravure rolls, Fig. 9, coated with 0.006-inch of PR copper required less machining and setup time. Although these operations are still experimental, the results are promising.

Record Stampers—In the manufacture of phonograph records the die consists of a copper electroform. This electroform is generally prepared from an acid copper-plating



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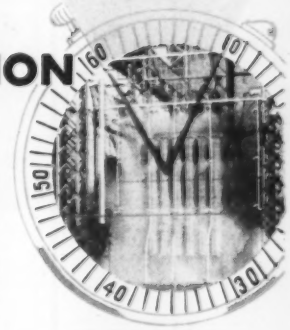

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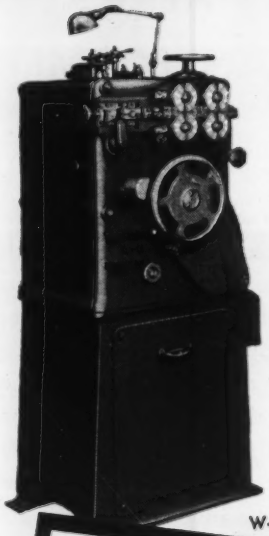

W-11

SPECIFICATIONS

Wire Diameter Range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra Wire Feed Gears Available)

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Production: 23 to 190 springs per minute with variable speed drive

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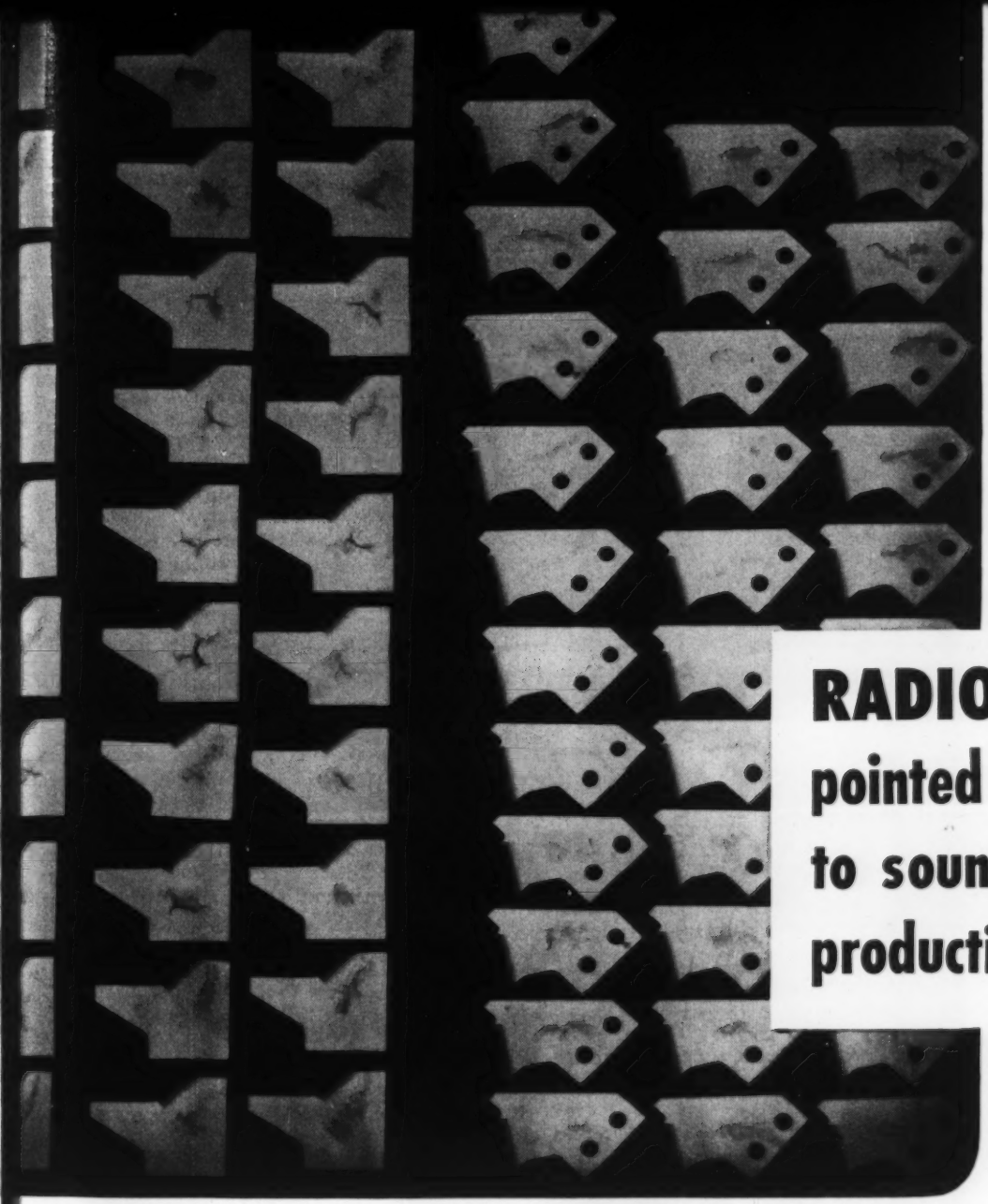
solution. The physical properties of the resultant copper are very limited, and in general, about 1000 impressions can be made per stamper. However, with the cyanide solution and the PR and Wes-X process, stampers have been made with a life many times greater. In addition, after as few as 200 stampings, the acid copper stamper shows metal flow, and distortion is evident in the music. With the PR stamper no evidence of distortion could be detected in the same period of usage. An experimental unit is now producing stampers in this fashion to determine the value of the improvement to the record industry.

Heavy Deposits—In the past copper coatings of more than 0.003 to 0.004-inch thick from a cyanide bath have not been possible without encountering nodules and other imperfections in the deposit. The new PR-plating process enables smooth and hard deposits of almost any thickness. In fact, a surface can be produced that is considerably smoother than the base member, Fig. 6, when heavy deposits are used. This type of deposit can be secured not only on flat or symmetrical objects, but on irregularly shaped pieces, providing some solution agitation is used.

In the wire-plating field, deposits of 0.006-inch have been obtained having a higher conductivity than that theoretically possible for copper. This is probably due to the increased density of metal, as well as the uniform fine-grain crystalline pattern of these deposits. This increased conductivity is probably obtained only in the direction parallel to the base member, while in the perpendicular direction the conductivity is less. Measurements are to be made to verify this.

A pilot plant is now in operation producing continuously copper-coated steel wire having a 0.006-inch copper layer on the surface. When plated directly many benefits are obtained that otherwise would be impossible. High tensile-strength steel wire for the core can be employed, which is not possible in the cladding technique used commercially today. In the cladding process, poor concentricity results in high rejects; however, with electroplating far superior uniformity results.

Field Reversal—When PR plating was first applied in industry, large contactors on the tank side of the generator seemed necessary. The reason was the slow reversal of the generator output current when the field current was reversed. Fig. 8 shows what happens to the current with



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Radiography revealed a recurring irregularity in a simple production casting—showing the need for a change in casting procedure.

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Any foundry that seeks a reputation for producing consistently sound castings will find radiography an invaluable aid. It detects irregularities. It pictures the effects of changes in gating, venting, pouring temperatures, chilling, and other variables. It pays for itself from savings in development time and in reduced rejections—builds customer good will.

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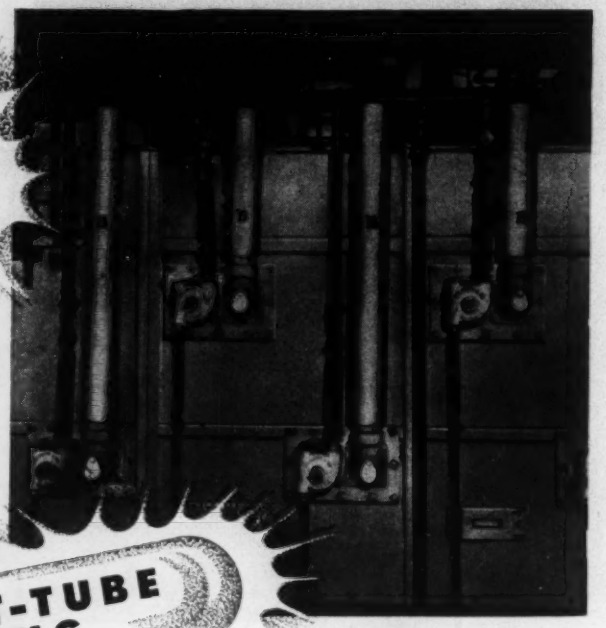

The first Holcroft radiant-tube continuous furnace was built in 1936, and is still producing efficiently. The close-up at right shows the simplicity of the Holcroft radiant-tube installation.

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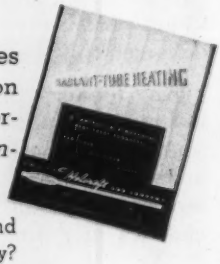
- The burner design permits *floating control,* with the same superior performance at all rates of heat input.
- All tubes are readily replaced without cooling the furnace; and electric heating elements are replaced without removing the tubes.

These are but typical of the many advantages provided by Holcroft leadership in production heat treat furnaces for *every purpose*—leadership based on *complete metallurgical and engineering service.* We invite your inquiries.



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field reversal, as compared with contactor reversal, for a cycle of 5 seconds plating and 1 second deplating. At least one large commercial installation has operated for a long period of time under these conditions of field reversal. However, the cycles employed today are considerably longer—approximately 20 to 30 seconds.

Effect of longer cycles on field reversal is shown in Fig. 10. Still further increases in the reverse period minimize the losses due to the slowness of the generator field in reversing.

When rectifiers are employed as a current source, fairly large contactors are still required. The problem is not as difficult as the generator contactors because the rectifier can be turned off for each cycle, so that the low-voltage contactors are not required actually to make and break the circuit. A complete range of contactors from 300 to 3000 amp has been designed for this application. These contactors are very simple in design and have a long life. All that is required with this contactor is a timer to complete a PR-current installation. Three different timers are now available—an electronic device, an electric-clock mechanism with cams, and a pneumatic delay timer.

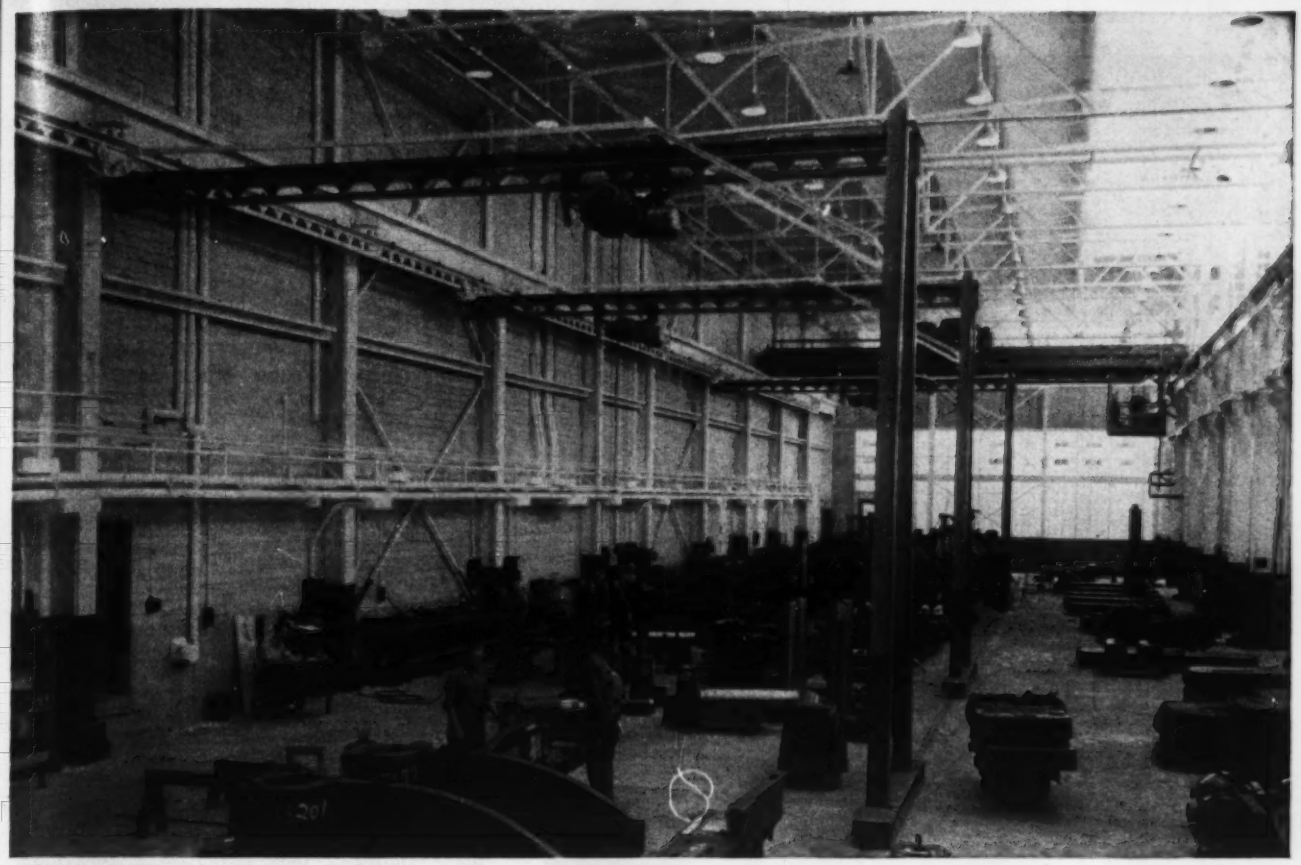
Steel Engineers Report

(*Continued from Page* 106)

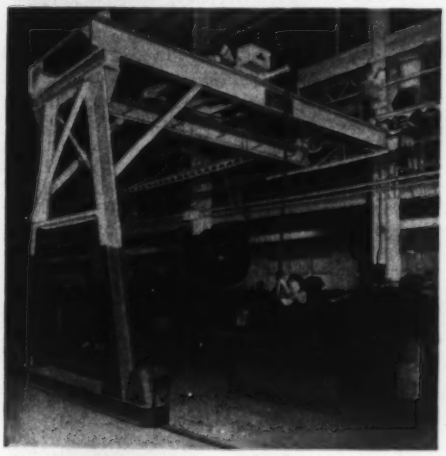
In 1917 Keystone built a 16-stand 10-inch continuous rod mill designed to use a 1¾-inch billet, 30 feet long. The mill was designed to produce 400 net tons of No. 5 gage rods per day which it did eventually. It operated this way for several years until the demand for rods increased. The original design was a two-strand mill from stands No. 1 to 16 with two short loops, one between stands 10 and 11 and the other between 12 and 13. In an attempt to increase delivered tonnage the large reduction gears were replaced with another pair of higher ratio which increased the speed of the first six stands about 20 per cent. Object of this move was to create a loop between stands 6 and 7 and repeat between these stands. By repeating a heavier bar here, a loop of 65 feet would give the same results as 120-foot loop between stands 7 and 8. This idea has a lot of merit and might be performed successfully today but at the time it was tried, 25 years ago, it resulted in failure. So it became necessary to abandon this idea and go back to the original setup. The large reduction gears were taken out and the original pair installed.

Tonnage Upped 20 Per Cent—In 1941 a plan was conceived whereby the tonnage could be increased by 20 per cent or more.

Basic principle of the plan responsible for the 20 per cent increase was a new stand arrangement which made it possible to speed up the roughing



Single bridge, hand-propelled gantries with electric hoists operating under heavy overhead crane in a machine tool plant.



Double girder, completely motorized gantry. Because gantries ride on a floor rail and one wall rail, their use often eliminates need of long span overhead cranes.

GANTRY CRANES BOOST PRODUCTION

IT is not unusual for skilled workers to wait 5 or 10 minutes and more in many shops for crane service. By providing a sufficient number of gantry cranes, much or all of this lost time can be eliminated and production aided.

Efficiency usually can be greatly improved by providing one large overhead crane for each shop bay — for the heavy lifting and transportation from one end of bay to the other — and a number of gantries to work under it, to do the light local or spot handling.

Several Cleveland Tramrail gantries generally can be purchased for the price of a large overhead crane and are available for manual or electric operation.

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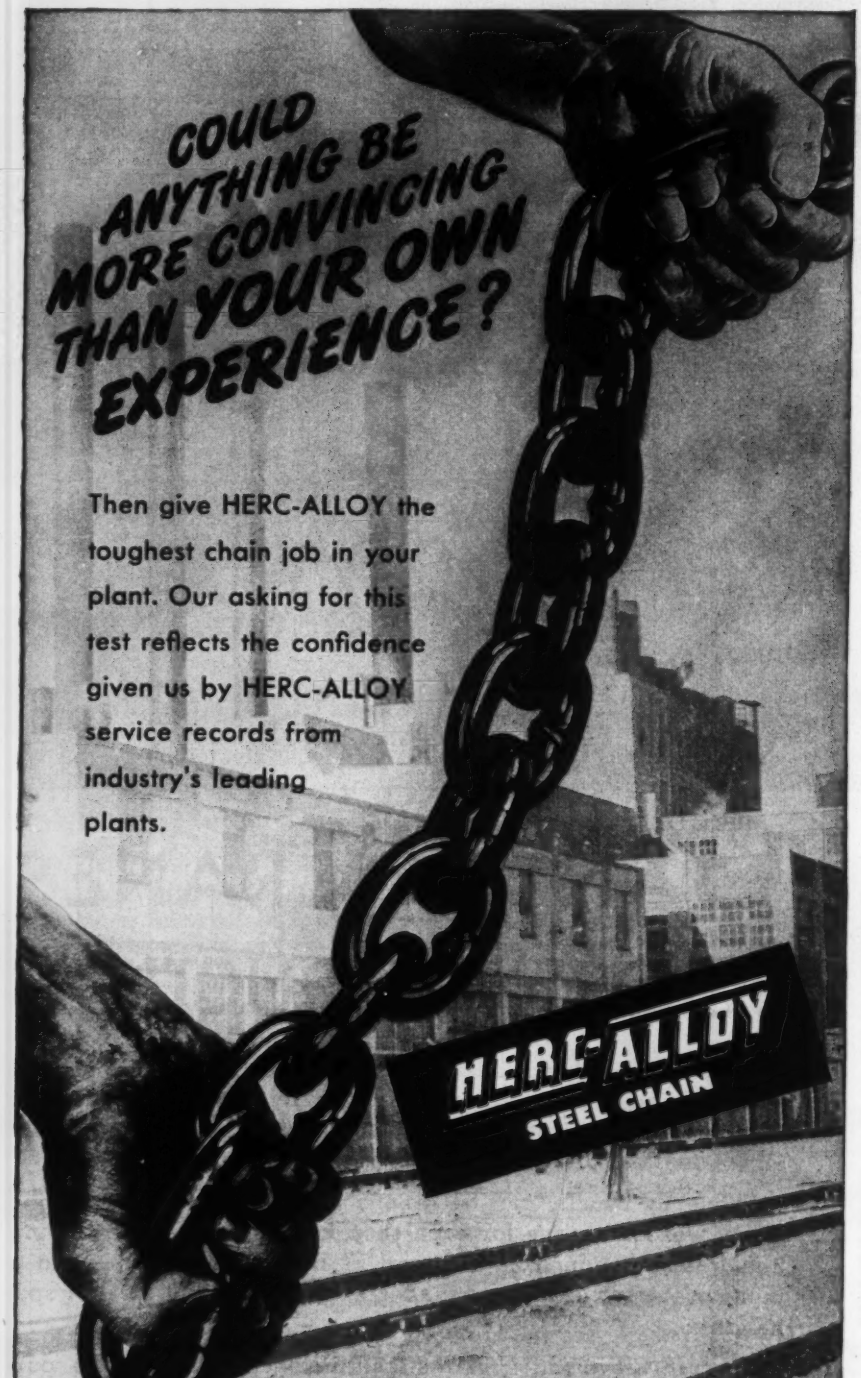
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mill again. Stands 9 and 10 were taken out of the rougher train and placed in front of 11 and 12 in the intermediate mill. "We formerly repeated from stand 10 to 11, now we repeat from 8 to 9," said Mr. Herman.

"Today we have an 800-ton mill with a short loop so we do exactly what we did 25 years before when we had a 400-ton mill with a short loop. We speed up the rougher again and build the loop up to the maximum once more."

Rewind Motor—"Speeding up the rougher could have been done by gear changes as before but the extra speed was obtained this time by rewinding the motor."

The question has been asked, "Why not increase the tonnage by speeding up the finishing mill?" The answer is that this would have no effect on the tonnage whatsoever. More speed would simply shorten the loops and reduce the average number of bars in the mill. If this were carried to the extreme, there would be no loops at all. Then the finishing mill and roughing constant would be equal with two strands only from stands 0 to 18. To obtain this condition the finisher would have to run 50 per cent faster which still would not increase the tonnage. This then would be equivalent to a two-strand straight-away mill having a delivery speed of 6937 fpm. Most anyone will agree that this is an excellent speed for a rod mill. This points out clearly what a long loop will do to increase tonnage. In the final analysis the long loop is responsible for it all.

Roughing Mill Slowed—After making the gear and diameter changes mentioned previously, the roughing mill was slowed down to maintain a loop of 40 feet. The extra loop length worked so well that another section was added to the looping floor and the motor then run at a higher speed to increase the loop length to 60 feet for a further increase in tonnage.

"We were feeling our way to see how far we could go with this idea. It developed that in several more steps we finally increased the loop length to 125 feet and this brought the motor up to top speed which was as far as we could go. With loops of this length, there were three or four bars in the mill at times with an average of three bars continuously."

Blooming Mill—The Work Horse

R. H. Wright, industry engineering department, Westinghouse Electric Corp., in his paper entitled **"The Blooming Mill—The Steel Industry's Iron Horse"** stated that the blooming mill has always been the iron workhorse of the steel industry. The farmer's draft horse has been supplanted by the tractor and the truck. Likewise the sheet bar mill, the hand sheet mill, the hand-looped strip mill and other slow speed types have given way to the high speed tandem mill. Like the draft horse, the blooming mill has never been noted for its high speed, yet it has continued to meet all demands for steadily increasing tonnages. Most of the steel that is rolled still passes through the blooming mill.

Most Mills Old—The number of new installations has not been increased greatly in recent years so about 85 per cent of the existing installations are over 20 years old. When these facts are taken into consideration, the production record of the blooming mill seems most remarkable.

The rising output has been brought about by a better utilization of existing apparatus, by constant improvements in ingot heating equipment and mill equipment and by major improvements in electrical equipment for main drives and auxiliaries.

Torque Increased—However, in the early days of electrification, no one had a true conception of the tonnage possibilities or of the probable future requirements. This was partly due to the performance of the steam driven mills of that time which was used as a guide in the design of the very first reversing drives. The engine-driven mills could roll execellent tonnages with the small ingots and light drafts which were then in use. The engines were fast but were limited in torque. They could be easily stalled with no damage resulting to the mill or the engine.

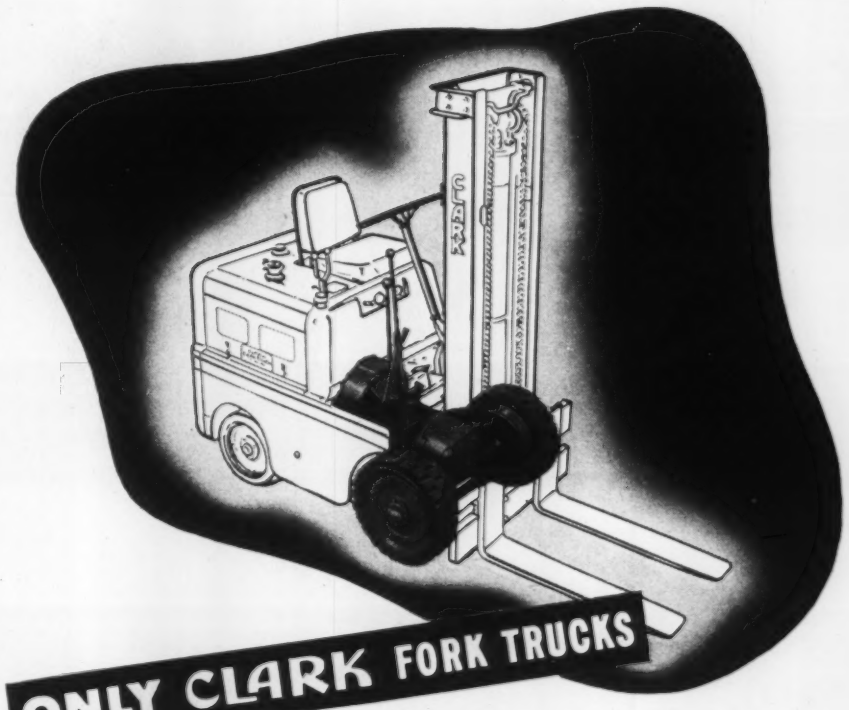
Realizing that electric drives could not be operated in this manner, the electrical designer's first consideration was for mechanical strength and overloaded capacity. So the first reversing blooming mill drives had about twice the maximum torque capacity of the engines in current use for the same service.

By about 1920 the present continuous and peak ratings were established. Later came the single armature motor for ratings up to 8000 horsepower, improved control, twin motor drive, and adjustable voltage auxiliaries. The wabbler coupling and the cast spindle and cast pinion disappeared very soon after the first electric drives came into use.

Adjustable Voltage Used—General tendency for new blooming mill installations has been to use adjustable voltage for all the auxiliaries except the manipulator fingers. However, some of the latest European mills will have adjustable voltage control for the manipulator's fingers. Chief overall advantage of adjustable voltage control is, of course, to reduce maintenance. Probably next is the increased screw-down speed which can be obtained for long screw movements with no sacrifice in accuracy for short movements. The soft yet speedy action of the manipulator's side guards is another advantage. A number of old auxiliary control installations have been changed to adjustable voltage to improve the overall performance of the mill.

Speed Varies — Under present-day conditions, the mechanical equipment and the speed of the main drive can be selected for a particular duty cycle. For heavy mills, the speed may be as low as 40/80 rpm and for light mills a speed of 60/120 rpm can be used to advantage. This simplifies the electrical equipment for the main drive and table drives.

Within the last four years 14 reversing blooming mill equipments have been purchased in this country for installation in the United States and abroad. Three of the mills involved are so small that there could not be much reason for using any-



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thing other than a standard pinion drive. For seven of the eleven remaining mills, twin motor drives have been chosen. Mill sizes range from 36 to 46 inches and the ratings of the drives vary from 5000 to 8000 horsepower. This is a definite departure from previous practice under which twin drives had not been used when the required capacity was less than 10,000 horsepower.

New Drives Speed Rolling

B. H. Caldwell, Jr., section engineer, large dc motors and generators, General Electric Co., in his paper entitled **"Developments in the Design of dc Motors and Generators for Rolling Mills"** reported that phenomenal advances in steel rolling techniques have been made during the past decade. Delivery speeds for tandem, cold strip mills have been greatly increased from some 3800 to 6200 fpm. Rod and tube mills have been greatly improved to increase production.

Challenge to Designers—These advances have presented a challenge to the designer of dc motors and generators.

Reduction of scrap and improvement of product quality are objectives toward which engineers are constantly striving. For rod and tube mill applications, this has led to investigation of the transient speed characteristics of the driving motors.

Close Synchronization Required—Of particular concern are tandem mills with separate motors for adjacent stands. Here very close synchronization of relative motor speeds is required. This can be obtained very readily for steady-state load conditions by proper adjustment of the fields of the motors. As the rod or bar enters the rolls, load is suddenly applied to the motor and the speed of the motor will drop. The speed drop may exceed the steady-state speed drop, in which case a recovery of state will follow the initial drop. It is during this period that improper speed relationships will exist between the stands with the net result of "blooming" or "stretching" of the finished product.

Watch Transmission Bus or Cable—Since it is the total resistance in inductance of the armature circuit which determines motor characteristics, it follows that attention should be given to the generators and transmission cable or bus. Common practice is to use a main generator bus feeding several motors, so the generator capacity is large compared with any one motor. This means that the resistance and inductance of the generators is normally quite small compared with the motor. The contribution from the bus or cable can also be kept small by giving proper consideration to physical arrangement, spacing of two polarities and length of run. In a well designed system the contribution from parts other than the motor can usually be neglected.

Of the motor design constants which contribute toward good performance the most important are the motor inertia WK 2, the ohmic or IR drop in the armature circuit, the steady-state speed regulation, and the degree to which the transient

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and steady-state characteristics are matched.

Provide for Oscillating Thrust—One problem which had developed with twin drives is that the motor is required to take an oscillating thrust. This thrust comes from the universal joints used in the mill spindle. It may be in either direction depending on the position of the universal, and there is a tendency for the thrust to go through a complete reversal during each revolution. Due to the greater spindle angle, the upper motor received the more severe thrust. The thrust must be taken in both directions, and the rapid reversal of thrust caused the shaft collar to strike the thrust bearing repeatedly in each direction with a sharp impact. Actually, the thrust force from the universal is not large. However, in accelerating the mass of the motor armature through a clearance distance of ⅛ to ¼-inch, a considerable amount of energy is stored, and this energy must be rapidly absorbed as the thrust bearing makes contact. The action is much the same as a massive battering ram.

Two Correctives—Two methods reducing the severity of this action suggest themselves. First, cushioning of the thrust bearing can be provided to allow an appreciable distance for stopping the moving armature.

Second, the distance through which the armature is allowed to move freely can be accelerated and limited to a small value.

Continuous Cascade Pickling

W. H. Stuck, metallurgical investigator, Jones & Laughlin Steel Corp., and J. H. Abrams, technical representative, American Chemical Paint Co., in their paper entitled **"Continuous Cascade Pickling"** reported that in recent years, increased production costs and consumer demands have dictated the need for greater tonnages of cold reduced steel strip. As part of their program to keep abreast of these trends, the Jones & Laughlin Steel Corp. recently installed a 42-inch continuous pickler at its Aliquippa works.

Best of Old and New—This installation embodies the better features of earlier picklers together with some entirely new improvements which makes it one of the most modern now in operation.

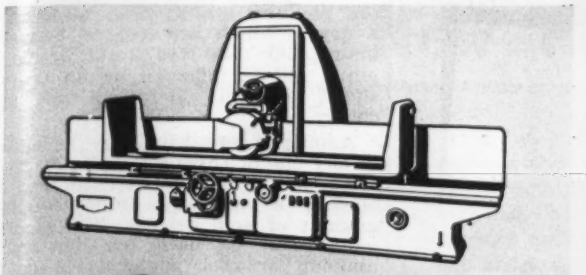
The line is comprised of two major divisions, the entry and the delivery ends, separated by a looping pit. Included in the entry end, following the sequence of operation, are: Coil conveyors, processor or scale breaker, up-cut shear, welder, flash trimmer, stitcher and main pinch roll No. 1. Following the entry end the strip is run into the looping pit where it folds into long loops. The maximum speed of the entry end is 1500 fpm and it is currently being operated near that speed.

The looping pit is 13 feet deep and equipped with motor driven adjustable side guides, which allow a maximum material width of 46 inches and a minimum width of 21½ inches.

Provides Storage—Purpose of the looping pit is to provide storage for sufficient length of strip that will permit the entry end to stop and make welds without delaying the delivery

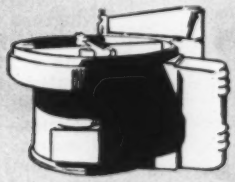
MATTISON GRINDERS

If its a Flat Surface to Grind
There's a Mattison to Grind it.

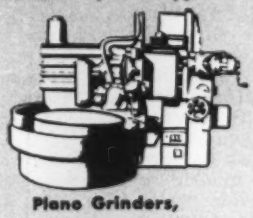


Precision Surface Grinders
Horizontal Spindle

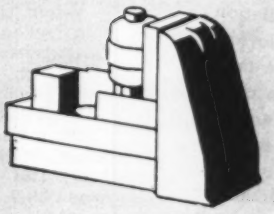
Disc Grinders,
Double Spindle Type



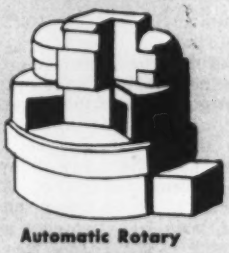
Vertical Spindle
Disc Grinders



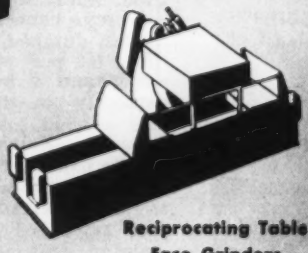
Plano Grinders,
Rotary Table Type



Rotary Table
Surface Grinders

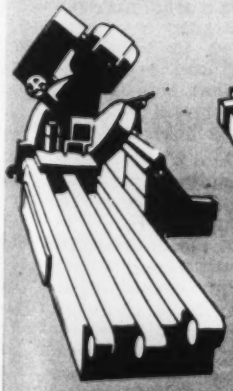


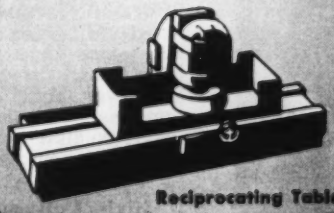
Automatic Rotary
Surface Grinders



Reciprocating Table
Face Grinders

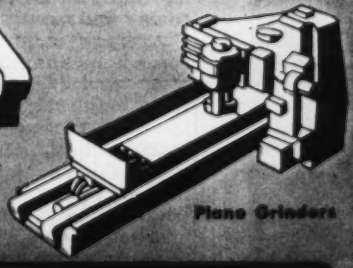
Disc Grinders,
Single Spindle Type





Reciprocating Table
Surface Grinders
Vertical Spindle

Face Grinders,
Traveling Wheel

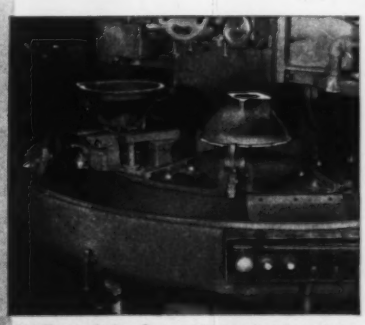


Plano Grinders

● With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison now is in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced fixture engineers are available to give you best production efficiency with Mattison Machines.

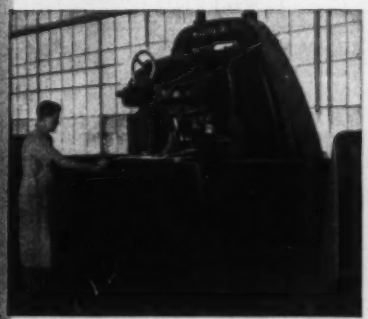
For any flat grinding, ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalog on all machines, ask for free copy of general bulletin.

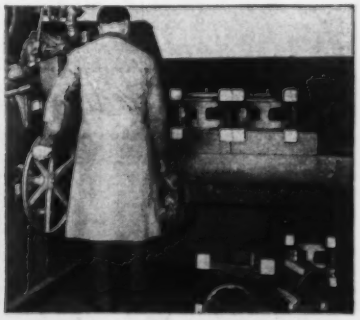


200 Transmission Case surfaces ground per hour on Mattison (Hanchett Type) Rotary Automatic Grinder. A special 8-station mechanical fixture permits one operator to grind each end of this large 35 lb. casting, flat and parallel. Stock removal .050".

Grinding cast-iron cams — 5" diameter, 1½" thick — stock removal, each side .030". Production, 120 surfaces per hour on Mattison (Hanchett Type) Rotary Surface Grinder.



2½ ton machine-bed ground in 60% less time on Mattison Precision Surface Grinder than required by former method, hand scraping.



Grinding feet of motor frames from rough castings and welded assemblies on Mattison (Hanchett Type) Face Grinder.

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end. Included in the delivery end are the pickling tanks, rinse tanks and a dryer, which are located between main pinch rolls Nos. 2 and 3. No. 3 pinch roll is followed by an up-cut shear, trimmer, oiler and final up-coiler.

Adding Acid—Acid may be added in any one of three ways on this line. First, is the conventional method of opening a valve and estimating the amount of acid needed. The second, which can be used for new tank makeup or spot additions in batch pickling, employs a solenoid operated valve controlled by an impulse counter; one impulse on this counter is equivalent to 310 pounds of 66 degrees Baume sulphuric acid.

The third method, which controls the continuous addition of acid and water—used with cascade pickling—consists of two proportioning flowrators—one for acid and one for water, solenoid valves, energizing equipment, ratio adjuster, totalizers and integrators. The flowrators are calibrated in terms of pounds per minute of acid and water.

When the line first started, it was run seven months using batch-type operation and since that time has used the cascade type operation almost exclusively.

Replenishment Slowed Output—During the period the line was operated with batch-type solution control, the average acid consumption was 33.9 pounds per ton of steel pickled, which is considered a good figure. Also, during that time, 125 tanks of spent solution were dumped and new solutions made up. The average concentration of these tanks, when dumped, was 10.7 per cent acid and 8.2 per cent iron. Tanks Nos. 2, 1, 3 and 4 were changed most frequently, in that order. In order to do a good job of pickling while replenishing spent solutions, line speeds were usually reduced with a resultant loss of production.

With cascade-type solution control, as practiced in this line, all acid, water and inhibitor additions are made continuously to No. 4 tank.

When cascade pickling was first used No. 4 tank was maintained at the same or higher acid concentration, than used in batch pickling. However, time and experience have demonstrated that this is not necessary, so that currently only 16 to 18 per cent acid is being added to No. 4 tank.

High Uniformity—The most outstanding feature of cascade solution control is the high degree of uniformity that can be maintained from day to day and month to month.

Average acid consumption with cascade pickling for a 16-month operation was 34.8 pounds per ton. Although this figure is 0.9 pounds per ton higher than that obtained with batch pickling, it is still quite good.

Continuous cascade pickling has been very successfully employed in operating the line. The continuous addition of acid holds solutions within desired concentration limits from day to day. Iron sulphate does not build up to an objectionable point. Greater flexibility is provided for pickling different grades of steel and more uniformity is possible in pickling the same grade of steel. It has also permitted faster pickling speeds.

New Products and Equipment

Portable Threading Units

Powered by ½-hp, 6-pole universal motors of 7500 rpm are four portable 2-inch threading machines comprising the Tom Thumb line produced by Oster Mfg. Co., Cleveland, O. No. 582 and No. 582-R are designed for threading pipe from ¼ to 2-inch standard range; extra range ⅛-inch pipe; extended range with drive shaft

2½ to 8 inches. Both have a bolt range of ¼ to 1½ inches. Nos. 581-A and 582-A are for threading bolts from ¼ to 1½ inches. The former has a pipe-thread range of ⅛ to 1¼ inches, while the latter is ¼ to 2 inches.

No. 582 is furnished with two stationary die heads and a wrenchless chuck for threading straight pipe or conduit and bolts. No. 582-R is furnished with a manually operated revolving die head and open-type vise for threading bent as well as straight pipe, conduit and bolts. Each bolt machine is equipped with fully automatic revolving die heads and open-type vise or threading head and straight bolts, rods, pipe, studs, etc.

Check No. 1 on Reply Card for more Details

For Finer Finishes

Increased tool and wheel life and minimized loss of parts due to surface scratches are results obtained from the use of the No. 00 1½ gallons per minute magnetic coolant

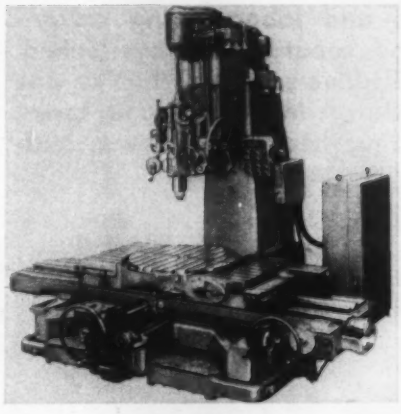
separator built by Barnes Drill Co., 854 Chestnut St., Rockford, Ill. Applicable to honing machines, various types of grinders, broaching, gear shaving and other machine tools and oil reclamation processes, the separator may be placed in the coolant storage rack to remove metal particles and fused abrasive from the work.

Coolant flows directly from the machine into the separator, passing through a restricted area between the separator housing and the cylindrical drum carrying a number of permanent alnico magnets. Drum rotates in opposite direction to coolant flow. After passing through the restricted area, coolant flows from the separator into the clean coolant compartment of the machine.

Check No. 2 on Reply Card for more Details

Built-In Table Jig Borer

Provision for a large rectangular work area with ample T-slots for holding down work and a built-in rotary table for circular indexing and polar co-ordinate work, are incorporated in the work table on the No.



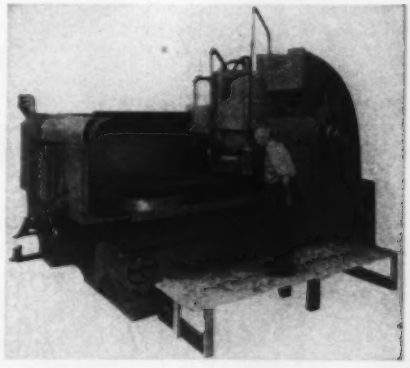
4E jig borer, announced by Pratt & Whitney Division, Niles-Bement-Pond Co., W. Hartford 1, Conn. Overall rectangular dimensions of table are 30 x 78 inches and the rotary table is 48 inches in diameter. The circular surface is higher by 1 inch than the rectangular surface. One-inch parallels are placed on the lower rectangular surfaces to utilize the full table work surface.

Center of rotary is 6 inches off center to the left in the rectangular table to provide maximum rotary work range for which the jig borer is capable. This increases table travel between machine spindle and rotary table centerlines from 30 to 36 inches when traversed to the left. When rotary table is centered under the spindle, maximum workpiece diameter that will clear the machine column is 72 inches. By moving rotary table outward from the spindle center line, a maximum workpiece of 108 inches in diameter can be accommodated. Power rotation in either direction, controlled by pushbuttons, is provided for rapid indexing.

Check No. 3 on Reply Card for more Details

Pendant Controlled Grinder

All motors are controlled by a pendant pushbutton arrangement on the large grinder built by Blanchard Machine Co., 64 State St., Cambridge 39, Mass. The segment type grind-



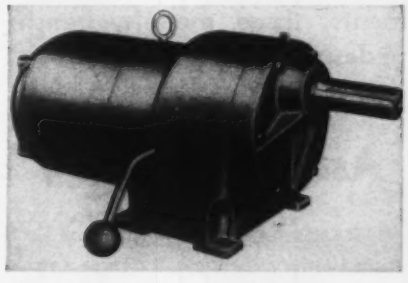
ing wheel is 42 inches in diameter and is powered by a 75 hp spindle motor. A 5 hp table motor mounted on the end of a table with feed change lever adjacent drives the 72-inch fully magnetic chuck. Auxiliary coolant tank is mounted behind the grinder.

Swing inside the waterguards is 84 inches; vertical range is ordinarily 18 inches, but may be provided up to 30 inches.

Check No. 4 on Reply Card for more Details

Selective Speed Drives

An integrally mounted electric motor and a four-speed transmission having both primary and secondary



gear reductions, are combined in the type R3C heavy-duty selective speed gearshift drives offered by Lima Electric Motor Co., Lima, O. Units deliver full rated horsepower in each of the four speeds and both

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SPEED PRODUCTION AND CUT ASSEMBLY COSTS...

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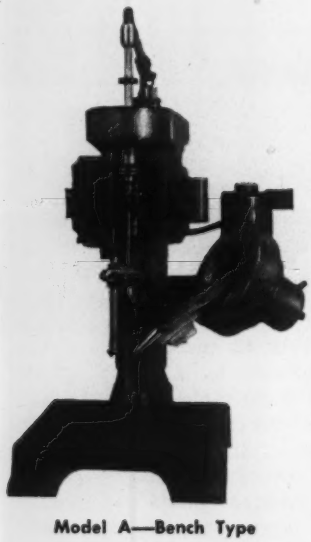
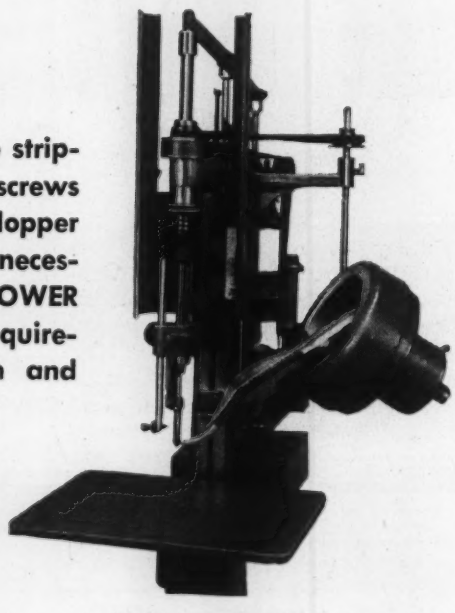
MODERN MACHINE METHOD

Thousands of manufacturers are profiting by the use of DETROIT POWER SCREWDRIVERS . . . They offer time and labor saving advantages too great to be overlooked. They will drive screws as fast as one a second! . . . . Machine, wood, brass, self-tapping sheet metal screws standard heads, special heads.



Model A—Bench Type

No marring of heads . . . no stripping of threads . . . all screws driven to uniform tension. Hopper fed, no handling of screws necessary. There's a DETROIT POWER SCREWDRIVER to fit your requirements, three models, bench and pedestal types.



Model B—Pedestal Type

Ask for Catalog

SEND SAMPLE ASSEMBLY FOR PRODUCTION ESTIMATE.

DETROIT POWER SCREWDRIVER CO. 2811 W. FORT ST. DETROIT 16, MICH.

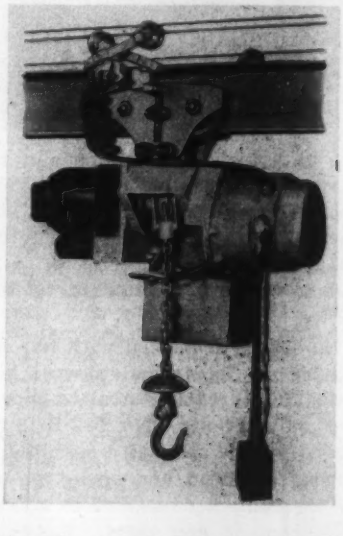
the constant torque and constant-horsepower two-speed motors are available on these units.

All drives have primary selective gear ratios of 4.15, 3.15, 1.85 and 1 to 1. Secondary gear reduction ratios are from 1.00 to 2.25. All are designed for operation on polyphase alternating current power supplies of standard frequencies and voltages below 600.

Check No. 5 on Reply Card for more Details

Chain-Type Electric Hoists

Available in load capacities of 500, 1000 and 1500 pounds is the chain-type Load King electric hoist developed by Yale & Towne Mfg. Co., Philadelphia 15, Pa. Lifting speeds up to 41 fpm, a lower and upper limit stop and a wide pick-up angle



are features. Standard models lift loads through any height up to 40 feet. Link chain over an electrically driven sheave supports the load.

Wound-up chain collects in a metal container as the hook raises; therefore, if a higher lift is required, all that is needed is a larger chain container. Hoist hook can reach out as far as 30 degrees from the vertical to pick up loads. Limit stops operate when the hook reaches predetermined levels and break the electrical circuit. Hand controller is suspended by light-gage chain.

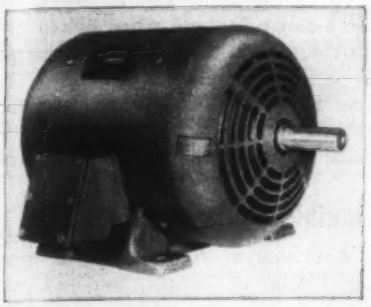
Check No. 6 on Reply Card for more Details

Corrosive Location Motors

Designed for applications where corrosive fumes and liquids are encountered are type CSP Life-Line motors, available from Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. Exposed parts are alkali-cleaned, hot-water rinsed, then rinsed in chromic acid spray. After drying, they are sprayed with pheno-

lic-alkyd-type enamel and baked. A coat of gray enamel and two to four baked dips of thermoset varnish, followed by a final coat of gray lacquer provides additional protection.

Motors use bronze split-hub, clamp-type blowers for corrosion resistance. Rotating Neoprene slingers on the



shafts between rear brackets and hood prevent entrance of dirt or liquids into the bearing housings. Stator windings are double-dipped and baked in thermoset varnish and all hardware is dipped in slushing compound prior to assembly. Factory-sealed prelubricated bearings are used.

Check No. 7 on Reply Card for more Details

Replacement Friction Clutch

Designed as a replacement for mechanical friction clutches is a new pneumatic friction clutch, developed by E. W. Bliss Co., 1420 Hastings St., Toledo 7, O. Identified as type L, the safety and control features are palm buttons for selectively stopping the press at various positions of stroke. Clutch may be installed on presses in the field without disturbing the present clutch shafts support bearings or flywheel and its driving arrangement.

Springs, disks, and linings are interchangeable with similar clutches supplied on new equipment by the company. It can be used with or without antifriction driveshaft support bearings. Linings may be replaced without removing the clutch or driveshaft assembly from the press.

Check No. 8 on Reply Card for more Details

Hydraulic Chucking Lathe

Toolslides with a 4 or 8-inch stroke or with two feed motions, all with individual controlled feed stroke and feed rate with infinite variation, may be furnished with the model CD automatic lathe offered by Morey Machinery Co. Inc., 408 Broome St., New York 13, N. Y. All moving parts are enclosed in a Plexiglas coolant guard, the closing of which is a part of the operating cycle as a safe-

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Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.
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ty feature. Workpiece is manually loaded and hydraulically chucked.

Although the lathe is driven by a 50-hp motor, the headstock is capable of transmitting up to 75 hp. J. I. C. standards are adhered to in hydraulic and electrical controls. Workpieces in ring form are chucked with a reduction in manual effort and chucking time by a special device. Micrometer dials on automatic toolslides provide rapid and accurate setting. Tungsten carbide tools are used for cutting speeds up to 1000 fpm. Tools are relieved on the return stroke to increase tool life and to prevent marking of the work.

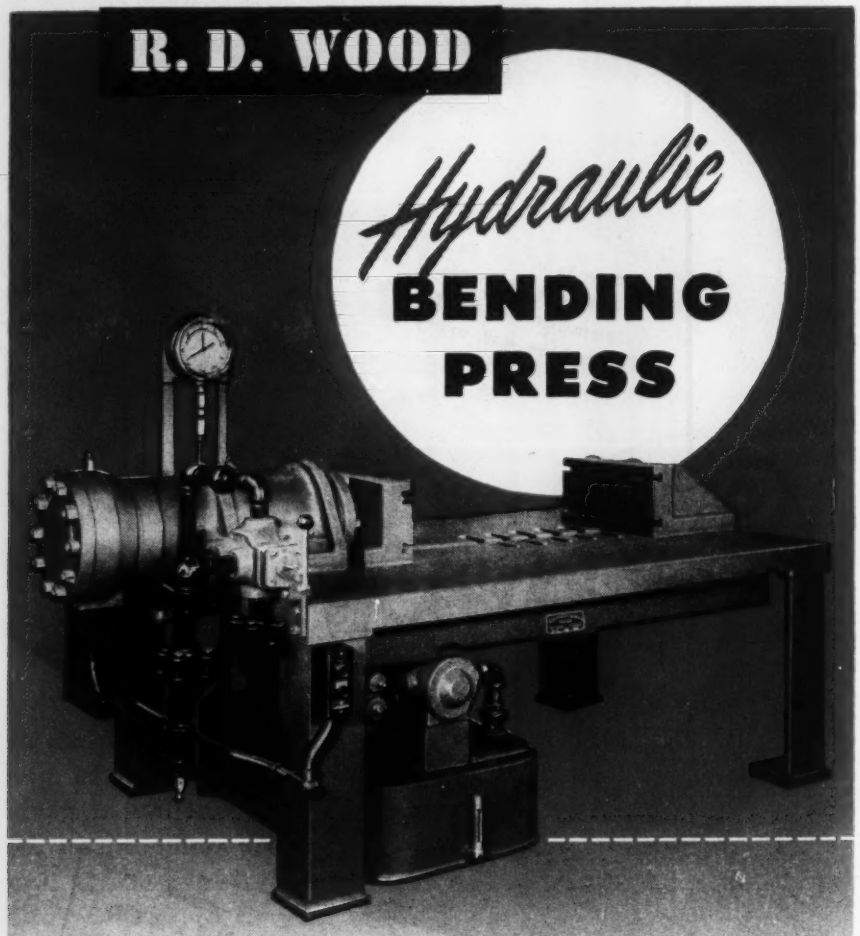
Check No. 9 on Reply Card for more Details

Angle Plate For Machinery

Precision-type angle plate for use on horizontal boring machines, planers, milling machines and radial drill presses where accuracy in the machined part is of primary importance are being made by Portage Machine Co., Akron, O. Material used is close grained cast iron, rough machined, and normalized for stress relief to prevent warping and then finish machined on all faces and edges.

Design incorporates heavy rear reinforcing ribs and a thickness of metal under the T-slots equal to that of the face. Angle plates are made in two sizes, with 6-slots and 4-slots high. Base of the 4-slot plate is the same size as the top of the 6-slot plate and when bolted to it provides additional height equivalent to a 10-slot plate. All slots are machined to take American standard ¾-inch T-bolts.

Check No. 10 on Reply Card for more Details



THIS compact 30-ton horizontal hydraulic press fits productively into general shop use—in the bending and straightening of rods, bars, light structural sections, and for similar work. Self-contained, it is well designed and constructed, with a smooth tool finished 3′ x 4′ steel work table, and 9″ x 18″ ram and resistance heads, machine tee slotted for dies or bending forms. Distance between rams is adjustable in 4″ increments from 1′ to 3′. The press stands 2½′ above the floor at the work table, and occupies an approximate floor space of 7′3″ x 4′6″. Higher capacities and various size tables can be furnished. Write, without obligation, to R. D. Wood Company for additional information.

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EST. 1803

R. D. Wood Company

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

Flexible Shaft Machine

A choice of five handpiece types, pencil-size or larger, and all with quick-detachable features, is provided for the 900 series flexible shaft machines announced by Foredom Electric Co., 27 Park Place, New York, N. Y. Unit can be employed in

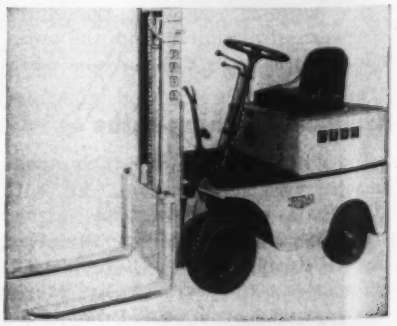
three ways: Hung up, on the bench or mounted under the bench.

Flexing qualities of the flexible shaft, which runs in a metal casing, is enhanced by tough oil-resistant Neoprene. Motors are high-speed with forced-draft air-cooled feature and are rated at 1/15-hp.

Check No. 11 on Reply Card for more Details

Lifts 2000 Pounds or More

New steering axle, solid carriage plate, redesigned forged forks, adjustable cushion operator's seat, larger diameter steering tires, and inter-



changeable masts are incorporated in deluxe cushion tire model FA-20-24 and pneumatic tire model FPA-20-24.

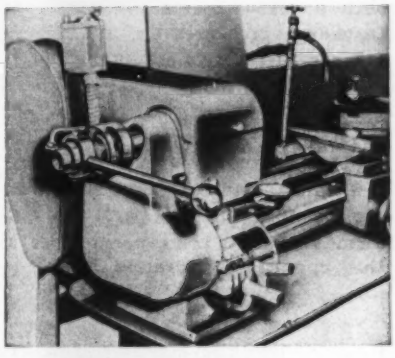
2000 pound, fork lift trucks offered by Buda, Co., Harvey, Ill. Both are rated at a 24-inch load center for greater lifting capacities which permit handling loads of 2220 pounds at 20 inches and 2600 pounds at a 15-inch load center.

Although a variety of lifting heights are available, the standard mast has a collapsed height of 64½ inches with an 85 inch lift. Other features are a two-speed forward and two-speed reverse transmission, single hydraulic tilt-raise-lower control lever, and gear shift levers mounted on the steering column.

Check No. 12 on Reply Card for more Details

Quick Acting Attachment

Designed as a production-type attachment for 1⅜-inch hole-in-spindle lathes, is a 1-inch capacity collet offered by Bell Equipment Co., 5212 Santa Fe Ave., Los Angeles, Calif. The Waltco quick-opening and closing attachments may be installed on any



lathe without disconnecting the gear guard. Cam spool and fingers give a vise-like holding power with a minimum of pressure on the actuating lever.

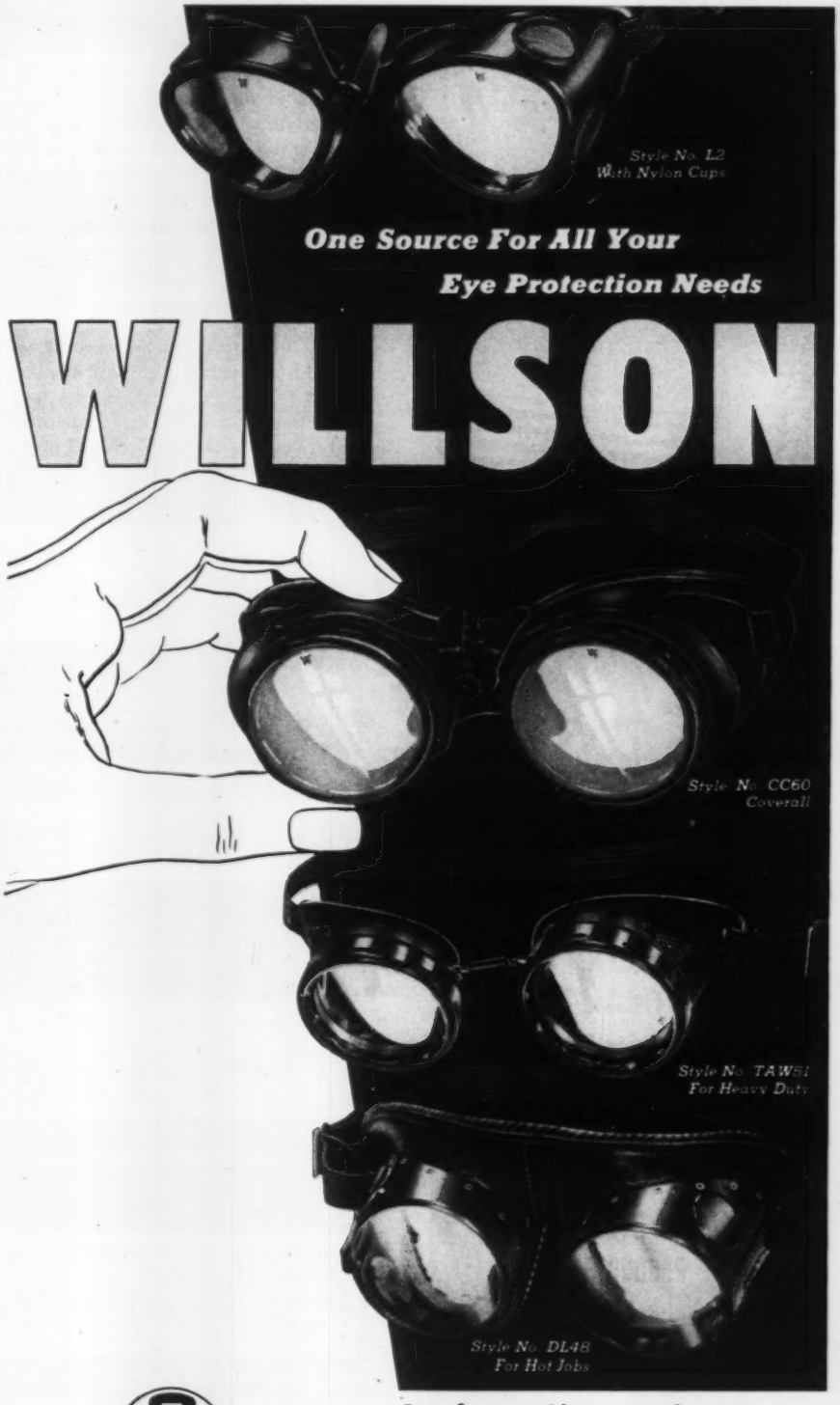
Necessary parts are of alloy steel, heat treated for strength and long wear. It is so designed so that at all spindle speeds the stop will be free in the open position.

Check No. 13 on Reply Card for more Details

Balanced Action Drill Unit

Force is loaded evenly with the No. 1000 automatic self-contained drilling unit manufactured by Black Drill Co., 1400 E. 222nd St., Cleveland 17, O. With simplified design, units are easily adjusted and maintained. All major parts are made of one-piece castings. Hydraulic check for controlling feed rate is mounted on the rear of the unit with two rigid side bars moving through oilless bushings to carry the rapid advance adjusting bolt.

Pressure is exerted in a continuous



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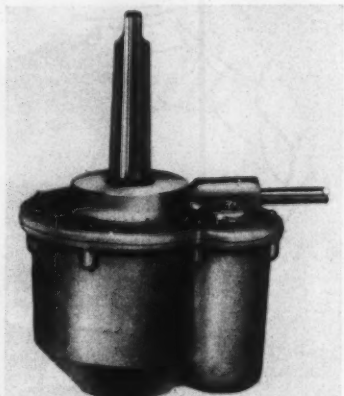
LSS-2

straight line. Motor shaft, integral with the rotor, is the only rotating member. Adjustments for feed rate, length of stroke, depth control and rapid advance are quickly made through three adjusting screws, while units are in operation. They may be operated in any position at any angle for single or multiple-setup work.

Check No. 14 on Reply Card for more Details

Tap Head Cuts Costs

Large hole tapping is simplified, production increased and tap life extended with the Tap King high speed tapping head offered by Procunier Safety Chuck Co., 18 S. Clinton, Chicago, Ill. Capacity of the unit is ⅜ to 1 inch in steel and 1⅛ inches



in softer materials. It is equipped with a friction clutch and spline drive to tap holder spindle.

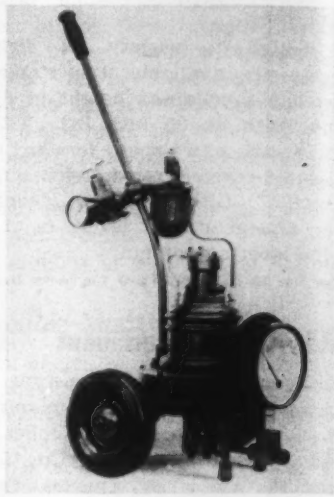
Tapping unit is available with No. 3, 4, or 5 Morse taper shanks and is also made in a cover clamping model for extra rigidity, accuracy and long life. A helical back gear reversing mechanism is incorporated.

Check No. 15 on Reply Card for more Details

Pressure Testing Intensifier

Testing of static pressure of boilers, piping systems, compressor cylinders and similar pressure vessels is possible with an air-operated hydraulic pressure generating device developed by Cooper-Bessemer Corp., Mt. Vernon, O. Developing up to 23,000 psi, the intensifier is compact in design and weighs 80 pounds mounted on a two-wheel rubber tired undercarriage for portability.

Operation requires only connecting to an ordinary compressed air line. Maintenance is by adding ordinary oil to an automatic lubricating unit. In operation it draws oil from its built-in supply reservoir. Variable static

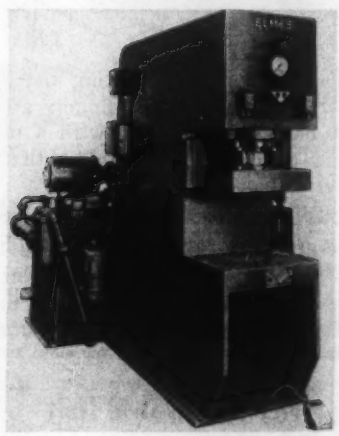


hydraulic pressures are preset by a turn of the regulator valve equipped with a dial-type air pressure gage. Discharge pressures are indicated on a large direct reading dial gage.

Check No. 16 on Reply Card for more Details

3-Way Operating Press

Shearing, riveting and straightening on forged steel parts are performed at 35 cycles per minute on the open-side hydraulic press de-



signed by Elmes Engineering Division, American Steel Foundries, Cincinnati 29, O. As the work handled is subject to variations in thickness, multiple operations performed on a single press stroke require accurate application and regulation of pressure.

Press has a moving platen measuring 16 x 18 inches and a 3-inch stroke. High and low pressure pump provides rapid advance, slower pressing speed and rapid return. A photo-

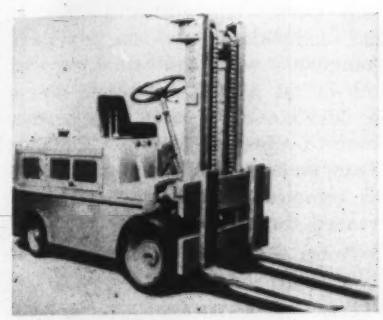
electric safety control stops platen immediately if an obstruction breaks the light beam at the entrance to dies. Various sizes and capacities are offered.

Check No. 17 on Reply Card for more Details

Dynatork-Equipped Truck

Features of a 10,000-pound capacity gasoline-powered fork-lift truck made by Industrial Truck Division, Clark Equipment Co., Battle Creek, include Dynatork drive, pivoted steering-axle assembly and a six cylinder Continental engine developing 50 brake hp at 1800 rpm. The drive transmits engine power through a magnetic field, across an air gap, eliminating need for any type of clutch.

Overall length of machine is 107



inches and width is 50½ inches. Outside turning radius is 104 inches. Forward and reverse control lever is mounted on steering column and response is instantaneous. A single gear shift lever controls low and high speeds of the Utilitruck-100.

Check No. 18 on Reply Card for more Details

• • •

RAPID STRIPPING: Loncoterge No. 2063, developed by London Chemical Co., Chicago 5, Ill., rapidly strips high baked acid and alkali resistant finishes and will also remove carbonized films and hard caked buffing compounds. It may be used as received or diluted in water, depending upon type of finish to be removed. It is used in the temperature range of 155 to 225 degrees.

Check No. 19 on Reply Card for more Details

SPECTROSCOPIC ANALYSES: With the double monochromator, made by Farrand Optical Co. Inc., New York 66, N. Y., it is possible to make spectroscopic analyses in any region of the ultraviolet-visible and infrared ranges of the spectrum between 0.2 and 35.0 microns. It can be operated manually or motor driven. Prisms are mounted and aligned on

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▶product touch-up
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You pick up the Binks DP portable spray painting unit and take it straight to the job. Right Johnny on the spot, you touch up damaged finishes...do painting that would require moving items back to the finishing department. You can maintain production schedules...keep your assembly line moving smoothly. Always sure of quality finishing, you use the DP unit anywhere there's a paint job to be done.

By actual test, this sturdy ⅓ horsepower Binks DP portable spray painting unit applies coatings with the same speed and quality as a full horsepower outfit...for only a fraction of the cost. Weight is only 47 lbs. For operation on 110-120 volts, a.c. A gas engine model is also available.

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Send today for your free copy of the illustrated Bulletin No. 601 which describes fully the DP unit and eight spray gun combinations for use with it. Learn how you can use the DP unit for maintenance work, small parts finishing, production touch-up, dusting, and drying.

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keyed holders and are interchangeable without readjustment.

Check No. 20 on Reply Card for more Details

CONTROL VALVES: A. Schrader's Son, Brooklyn 17, N. Y., announces a complete line of small compact operating valves featuring the sliding disk principle. One steel bolt holds the two-piece body and internal parts in place. Valves are available for hand, foot, knee or mechanical actuation.

Check No. 21 on Reply Card for more Details

MICROSCOPES: Twelve new Spencer polarizing microscopes incorporating highly efficient Polaroid optical elements in place of calcite are introduced by American Optical Co.'s Instrument Division, Buffalo, N. Y.

Check No. 22 on Reply Card for more Details

PROTECTION FOR WELDERS: To protect welders on jobs where there are hazardous gases or smokes due to product residue or vaporization, Acme Protection Equipment Co., Chicago 12, Ill., has developed a special full vision gas mask. The Pur-a-weld can be used interchangeably with dust and fume canister or a compressed air supply unit.

Check No. 23 on Reply Card for more Details

SAMPLES AIR: On the spot analyses of atmospheric concentrations of chromic acid mist are possible with the new portable Samplair, manufactured by Mine Safety Appliances Co., Pittsburgh 8, Pa. It is hand operated.

Check No. 24 on Reply Card for more Details

FAN-COOLED MOTOR: Sterling Electric Motors Inc., Los Angeles, Calif., announce that their Klosd-Tite fan-cooled motor is now available with face mounted end bracket having NEMA style C dimensions, in ratings ¾ to 20 hp inclusive. They are obtainable in footless type or standard horizontal type with feet.

Check No. 25 on Reply Card for more Details

END MILL: Shearcut Tool Co., Reseda, Calif., has developed a new Shearcutting type of end mill which applies the rotary broaching technique to milling machine operation. It is ground from a solid after having been hardened to a Rockwell C of 63 to 65.

Check No. 26 on Reply Card for more Details

HEATING UNITS: Fedders-Quigan Corp., Buffalo 7, N. Y., announces wall radiation for heating industrial or commercial buildings. High heat output is achieved by bullet-expanding cold drawn, seamless steel, pressure type tubing into collared, dieformed steel fins. Enclosures are available in three styles. Wall radiation is available in lengths from 2 feet to 12 feet in 6-inch increments.

Check No. 27 on Reply Card for more Details

THREE IN ONE: Adapted for general brazing, cast iron welding and cast iron brazing, an all-purpose flux has been developed by York Engineering Co., Chicago 23, Ill. It is designated as York's 77.

Check No. 28 on Reply Card for more Details

PLASTIC PASTE FOR BEARINGS: United American Metals Corp., Brooklyn, N. Y., announce an improved plastic paste for tinning bearings. Designated as Tintite, it is spread over the shell which is heated to about 650° F, then the surface is wiped to a bright finish and babbitt is poured.

Check No. 29 on Reply Card for more Details

NO MELTING POINT: Plastilube, a new all purpose lubricant which has no melting point, is introduced by Warren Refining & Chemical Co., Cleveland 15, O. It is said to have excellent pumpability at low temperatures and does not break down during working. It is adaptable to virtually every automotive and industrial use.

Check No. 30 on Reply Card for more Details

FOR PORTABLE GRINDERS: Designed for use on right angle portable grinders and disk sanders primarily in weld grinding and foundry operations, a new reinforced hub wheel is announced by Norton Co., Worcester, Mass. It has a strong composition safety web molded onto the back which serves to hold wheel together in event of accidental breakage.

Check No. 31 on Reply Card for more Details

ROTARY DRILL BIT: Known as Cyclo-Twist, a new carbide tipped rotary drill bit is offered by New England Carbide Tool Co., Cambridge, Mass. It has a positive double "dust lift" that is built in and removes the dust from the hole as it drills. Drills are available in sizes from 3/16 to 1-inch inclusive.

Check No. 32 on Reply Card for more Details

CONTROLS VIBRATION: For mounting pumps, compressors and other equipment where efficient isolation is required, Korfund Co., Long Island City 1, N. Y., offers a new vibration isolator. Type F has steel springs and the housings are malleable castings, sealed by a cylindrical cork ring which snubs horizontal thrust and prevents all metal-to-metal contact.

Check No. 33 on Reply Card for more Details

TIME DELAY VALVE: Production of a time delay valve which operates by volume measurement of air, is announced by Ross Operating Valve Co., Detroit 3, Mich. Unit is available for use on all the company's in-line operating bodies which range from ⅛ to 1¼-inches in size and are furnished in straightway, 3-way normally open and normally closed models.

Check No. 34 on Reply Card for more Details

REDESIGNED COUPLING: Airflex coupling has been redesigned by Falk Corp., Milwaukee 8, Wis., so that components are entirely interchangeable with equivalent components of all Airflex couplings now in use and standard parts may be combined to allow six different mounting arrangements. Improvement in rubber composition and bonding have increased torque capacity.

Check No. 35 on Reply Card for more Details

FLOW MEASUREMENT: Three basic units in standard pipe tees plus indicating, controlling, recording or telemetering instruments provide complete plant-wide flow measurement. Flow rates from 2 to 6200 gallons per minute and from 3 to 12,500 cfm are handled with a minimum number of basic metering parts designed for installation inside standard pipe fittings. Designated as Ratosleeve meters, they are available from Fischer & Porter Co., Hatboro, Pa.

Check No. 36 on Reply Card for more Details

FOR LIGHT GAGE STEEL: Steel-Tectic, a low amperage electrode is now available in a smaller diameter for metallic arc welding to extremely thin gage steel. Made by Eutectic Welding Alloys Corp., New York 13, N. Y., the 3/32-inch electrode features the new FrigidArc coating which "pin points" heat of the arc, preventing extensive permeation of the metal.

Check No. 37 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

THE METALWORKING industry sees no easing in its near-term need for steel. As a result the heavy order volume that has pushed steel production to capacity continues undiminished. As fast as steel company order books are opened for third quarter shipments there is a rush to get on them. In some cases, particularly those concerning the light, flat-rolled products, the surge has been so great that schedules for all leading grades have been absorbed promptly.

PRODUCTION—This suggests the need for continuance of the present capacity rate of steel ingot production. Obstacles to adherence to such a rate, however, are summer vacations in the steel mills, and possible strikes in industries either buying from or supplying the steel industry. Boosting output last week to 100.5 per cent of capacity, steelmaking furnaces poured out 1,915,798 tons, a new weekly record. Although the industry in years previous to 1950 operated at a higher percentage of capacity it has never had a capacity as large as the present one. Last week was the second consecutive one in which a new alltime record for tonnage output was set.

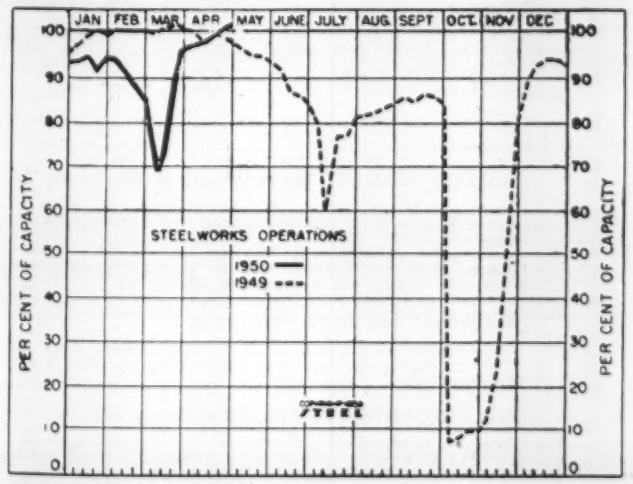
OUTLOOK—While the overall demand for steel continues unabated there are some soft spots in activity. A midwestern producer of wheel tractors is laying off a third of its employees this week because of excessive inventories. In the East, plate and bar fabricating shops, although they are enjoying good business, have cut prices on competitive products in an effort to assure volume.

PRODUCTS—Notable among products in tight supply are sheets and strip. Although modernization and installation of additional facilities have aided measurably in meeting the demand for light, flat-rolled steel many consumers say mill allotments are either retarding production schedules or preventing desired increases. Hot-rolled bars are not in as critical supply-demand relationship as sheets and strip but sellers find it necessary to distribute them on an allotment basis. Cold-finished carbon bar promises depend much upon whether the cold drawer has the rough stock in inventory; if he has the stock he can ship in three to four weeks. While some plate mills can still make deliveries on heavy gages within five weeks and on lighter gages in nine weeks the market is tightening. The structural market is still dominated by public work.

ORE—Seeing continued heavy production of steel and being unable because of ice conditions to get an early start in moving iron ore down the Great Lakes, ore shippers have requested government permission to use emergency load lines for bulk vessels this season. Use of emergency load lines would enable the ore fleet to carry between two and three million additional tons of ore.

FREIGHT RATES—In their effort to get in tonnage as fast as possible many sheet consumers may not go far in attempting rearrangement of shipping schedules to obtain full advantage of the lower rail rates, effective today, in the northeastern part of the nation. They, nevertheless, will study the new tariffs closely and utilize them when possible.

PRICES—Reflecting withdrawal of prices at the lower level of market ranges on some products, STEEL's arithmetical price composite on finished steel rose last week to $93.23 from $93.18 of the preceding week. A year ago the composite was $94.45. STEEL's weighted price index held at 156.13, compared with 154.01 for the corresponding week last year. Continued advance in scrap prices pushed the composite on steelmaking grades to $30.17 from $29.50 of the preceding week. A year ago the composite was $23.25. Pig iron price composites remained unchanged at $46.47 for No. 2 foundry, $45.97 for basic, and $47.27 for malleable.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Apr. 29	Change	Same Week 1949	Same Week 1948
Pittsburgh	100.5	+ 3*	98	92.5
Chicago	104	— 0.5*	99	84
Eastern Pa.	95	+ 2	93	81
Youngstown	106	+ 1	105	75
Wheeling	102.5	— 2	92	80
Cleveland	99	+ 3*	101	97
Buffalo	104	0	101.5	88
Birmingham	100	0	100	100
New England	88	+ 3	77	81
Cincinnati	106	+ 3	106	84
St. Louis	77.5	— 2.5	80	89
Detroit	102	— 2	109	101
Western	94	+ 1	93.5	..
Estimated national rate	100.5	+ 0.5	98	87

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.
*Change from revised rate.

Composite Market Averages

	Apr. 27 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	154.01	100.65
Index in cents per lb...	4.230	4.230	4.230	4.172	2.727
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.23	$93.18	$93.18	$94.45	$57.55
No. 2 Fdry Pig Iron, GT	46.47	46.47	46.47	46.57	24.67
Basic Pig Iron, GT.....	45.97	45.97	45.97	46.10	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT..	30.17	29.50	28.75	23.25	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Apr. 27 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.15
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	4.00	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.50	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.50	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.65	2.20
Sheets, H.R., Pittsburgh ..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago ....,3.35	3.35	3.35	3.25	2.20	
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh .	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.50	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, ⅜-⅝", Pitts...	3.85	3.85	3.85	3.775	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ..	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	43.38	21.38
No. 2 Fdry. (Birm.) del. Cin.	49.08	49.08	49.08	49.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$34.00	$33.00	$32.00	$24.00	$20.00
No. 1 Heavy Melt. E. Pa..	27.00	26.00	25.25	22.75	18.75
No. 1 Heavy Melt. Chicago	29.50	29.50	29.00	22.50	18.75
No. 1 Heavy Melt. Valley..	33.75	33.75	32.75	22.00	20.00
No. 1 Heavy Melt. Cleve. .	30.25	30.25	29.25	18.75	19.50
No. 1 Heavy Melt. Buffalo.	29.75	29.75	28.25	23.50	19.25
Rails, Rerolling, Chicago..	46.50	46.50	45.50	27.75	22.25
No. 1 Cast, Chicago	42.50	42.50	42.50	27.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$14.25	$7.00
Beehive, Fdry., Connlsvl...	16.00	16.00	16.00	17.00	7.75
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	19.50	19.50	18.50	20.00	12.00
Zinc, E. St. Louis	11.00	11.00	10.25	13.00	8.25
Lead, St. Louis	10.80	10.55	10.30	14.825	6.35
Tin, New York	76.75	77.50	76.50	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del.	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14 Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco, del. ...	53.70	54.20	....	....
Granite City, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax).....	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
Neville Island, Pa. P6	46.00	46.50	46.50	47.00
Pitts, N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKees Rocks, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers, O. S16	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	52.50

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

Niagara Falls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2.	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles Tenn. T3	$80.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Apr. 27, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
SoDuquesne,Pa. C3 .. 51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 .... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 . 58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2 .. 53.00
Munhall,Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
SoChicago,Ill. C3 ..... 53.00
So.Duquesne,Pa. C3 .. 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 .... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 . 65.00
Detroit R7 ..... 63.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ..... 85.00
Gary,Ind. C3 ..... 63.00
Geneva, Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 .... 63.00
Johnstown,Pa. B2 ..... 63.00
Lackawanna,N.Y. B2 .. 63.00
Los Angeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14 . 63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 ... 82.00
Warren,O. C17 ..... 63.00

Alloy (NT)
Bethlehem,Pa. B2 .... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3 . 68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 .... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 .... 66.00
Midland,Pa. C18 .... 66.00
Munhall,Pa. C3 .... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14 . 66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 .... 66.00
Youngstown Y1 ..... 66.00

SHEETS BARS (NT)
Mansfield,O. E6 ..... $58.00
Sharon,Pa. S3 ..... 57.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Ind.Harbor, Ind. I-2 ... 76.00
Massillon,O. R2 .... 76.00
So.Chicago,Ill R2 .... 76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O R2 ..... 3.15
Youngstown C3, R2 ... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 .... 3.85
Houston Tex. S5 .... 4.25
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 .... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 .... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11 . 4.10
Pittsburg,Calif. C11 ... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J R5 .... 3.95
So.Chicago,Ill. R2 .... 3.85
SparrowsPoint B2 .... 3.95
Sterling,Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston, Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 ... 3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
Los Angeles B3 ..... 4.00
Minnequa,Colo. C10 ... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3, W14 . 3.40
So.SanFrancisco B3 ... 3.95
Torrance,Calf. C11 ... 4.00
Weirton,W.Va. W6 .... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1 . 5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14) B2 5.20
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

H.-S., L-A Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 ..... 4.20
Weirton,W.Va. W6 .... 4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 ..... 3.60
Conshohocken,Pa. A3 .. 3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.50
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2, Y1. 3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14 . 3.50
SparrowsPoint,Md. B2.. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2, Y1. 3.50

PLATES (Universal Mill)
Fontana,Calf. K1 .... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 ..... 5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown, Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2.. 4.40

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1. 5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SparrowsPoint,Md. B2 .. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l. (15) A10 .. 3.75
Ashland,lcl(15) A10 .. 4.25
Cleveland,cl R2 ..... 4.10
Warren,O. cl R2 ..... 4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 .. 3.45
Atlanta,Ga. A11 ..... 3.60
Bessemer,Ala. T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.65
Emeryville,Calif. J7 ... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif, K1 ..... 4.10
Gary,Ind. G3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1.. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
Los Angeles B3 ..... 4.15
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11. 3.45
Pittsburg,Calif. C11 ... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14. 3.45
So.Duquesne,Pa. C3 ... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 ... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1. 3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
Los Angeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14. 3.95
So.Duquesne,Pa. C3 ... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 .. 3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 .... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1. 5.20
Johnstown,Pa. B2 .... 5.20
Lackawanna,N.Y. B2 .. 5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 ... 5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 .... 4.15
BeaverFalls,Pa. M12,R2. 4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 ..... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 .. 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13. 4.15
Hartford,Conn. R2 .... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 ... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburg J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .. 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .. 4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 ..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13. 4.90
Hartford,Conn. R2 .... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 ... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 .... 5.10
So.Chicago,Ill. R2, W14. 4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass. A7 .... 5.20
Youngstown F3, Y1 .... 4.90

RAIL STEEL BARS
ChicagoHts.,Ill.(3) I-2.. 3.30
ChicagoHts.,Ill.(4) I-2.. 3.45
FortWorth,Tex.(26) T4.. 4.33
Huntngtn,W.Va.(3) W7.. 3.45
Moline,Ill.(3) R2 ..... 3.40
SouthAvis,Pa.(2) J8 ... 3.30
SouthAvis,Pa.(41) J8 .. 3.30
SouthAvis,Pa.(42) J8 .. 3.30
Williamsport(2,3) S19 .. 3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14. 9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng. Bolt) U1 ..13.50
Dover(Wrgt,Iron) U1 .12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ..4.35
Los Angeles B3 ..... 5.00
Seattle B3, N14 ..... 5.10
SouthAvis,Pa. J8 ..... 4.35
So.SanFrancisco B3 ...5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta,Ga. A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2,Y1.3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
Los Angeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 .. 4.35
Seattle,Wash. B3, N14.. 4.20
SouthAvis,Pa. J8 ..... 3.45
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2 .. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 .. 3.45
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1. 3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. N12 ..... 3.50
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.35
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 .... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 .... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 .. 5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calf. K1 .... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1. 5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 ...5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C2 ..... 5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 .... 5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 .... 7.05
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1. 6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 ..... 6.20
Sharon,Pa. S3 ..... 6.20
SparrowsPoint(38) B2 ..6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.60
Gary,Ind. C3	6.50
Ind.Harbor I-2	6.50
Irvin,Pa. C3	6.50
Yorkville,O. W10	6.50

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville, O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10	8.95

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky (8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths)	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville, O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon, Pa.S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	*6.85*	*8.80*	...
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	....	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket, R. I. N8:					
Cleve.orPitts.Base (29)	4.70	5.95	6.55	8.50	10.80
Worcester,Base (29)	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.15
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4, E5	4.15
NewHaven,Conn. A7, D2	4.65
NewYork W3	5.00
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa.(30) S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(25) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cld.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J., A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark,6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	*9.80*	*11.30*
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
Duluth A7	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo, C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	*8.35*	*8.35*	*8.60*
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

RAILS

	Std. No. 1	Std. No. 2	All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...

Key to Producing Companies

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M10	Missouri-Illinois Furnace
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Co.
N5	Nelsen Steel & Wire Co.
N6	New Eng.HighCarb.Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst. Steel Roll Mill's
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron&Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke&Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Steel Div. Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	Reliance Div.,EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
T2	Tenn. Coal, Iron & R.R.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
V2	Vanadium Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	Wstrn.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W16	Worth Steel Co.
W18	Wyckoff Steel Co.
Y1	Youngstwn Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 5 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ⅛" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Up to 0.035 C; 4.40c, 0.035 C and over.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(29) 0.26-0.40 C.
(30) 0.40 C and less.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both sides	Strip Hot-Rolled Carbon Base 10%	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Copper Base Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxodized. † Deduct 4.25c for hot-rolled. Production points for carbon base products; Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ⅞-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long..... 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up Bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ⅞-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger.....	16	
H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅞-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy. 35	Reg. 41	Lght. 41
⅝-in. & ⅞-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. .. 50
- ¾-in. through 1 in. .. 43

Longer than 6 in.:
- ¼-in. through ⅝-in... 33
- ¾-in. through 1 in... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger ... 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
7/8-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Fort Wayne, Ind., bars and and wire, except Types 501 and 502 J6.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 22.00
Toluol, one deg. .19.00-24.75
Industrial xylol ..20.50-26.50
Per ton bulk, ovens
Sulphate of ammonia .$45.00
Cents per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots..14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags....7.40-8.50	
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots..23.25-26.25	
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh 52.00-55.00	
Minus 35 mesh	48.00
Minus 200 mesh....	56.00
Nickel, unannealed61.00-66.00	
Silicon 34.00-40.00	
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	86.50
Zinc, 10-ton lots..15.25-18.00	
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed. 1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb.....	2.25
200 to 500 lb	2.60
less than 200 lb...	2.75
82-88%, freight allowed, 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll.fur. .$14.00-14.50
Connellsvll.fdry. .15.50-16.50
New River, foundry...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
New England, del.‡ 23.40
Chicago, ovens 21.00
Chicago, del. .....‡22.45
Detroit, del. 24.91
Terre Haute, ovens....21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
Chicago, del. 24.12
Cincinnati, del. 23.67
Detroit, del. 24.65
Ironton, O., ovens.....20.40
Cincinnati, del. 22.71
Painesville, O., ovens..21.90
Buffalo, del. 24.02
Cleveland, del. 23.62
Erie, del. 22.04
Birmingham, ovens 19.15
Philadelphia, ovens ...21.25
Neville Island,Pa.,ovens 21.00
Swedeland, Pa., ovens.21.20
Portsmouth, O., ovens..20.15
Cincinnati, del. 22.71
Detroit, ovens 21.65
Detroit, del. 22.65
Buffalo, del. 24.00
Flint, del. 24.09
Pontiac, del. 23.04
Saginaw, del. 24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS				PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§	Standard Structural Shapes	Carbon	Floor
New York (city)	5.75	6.84	7.20	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.64	7.00	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.93	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.73	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.44	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.24	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	...	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.35	5.32	5.95	8.31	5.37	5.52	6.72
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.15	5.12	5.75	8.16	5.17	5.32	6.52
Cincin. (w'hse).	5.32	5.84	6.44	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.58	6.33	7.23	5.63	...	5.53	6.28	10.08††[5]	5.58	5.73	6.93
St. L. (w'hse).	5.38	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.00	7.50	7.03[3]	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse)..	5.80	7.30	7.50[3]	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	7.60[3]	7.50[2]	6.75[9]	8.25[3]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]
Kans. (w'hse).	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 9999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 15½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 158)

Metal Price Level Rises

Reflects high consumpion rate and moderate stocks. Lead now at 10.80c, St. Louis

New York—Nonferrous metal prices continue to move upward. The latest advances have been in lead which rose ¼-cent to 10.55c on Apr. 20 and a like amount to 10.80c, St. Louis, on Apr. 26. Since the first of last month, copper has advanced 1 cent to 19.50c, delivered Connecticut Valley; zinc, ¾-cent to 11.00c, East St. Louis. Some interests in the latter market would not be surprised if prices should increase again soon. Large producers are less willing to sell zinc for June delivery at the present market price, preferring to offer metal on the June average basis.

The tin market continues erratic with prompt Straits selling at around 76.75c toward the end of the week. May is quoted 76.00c; June, 75.50c.

Lead Sales Still Heavy

New York—Sales of lead at 10.80c, St. Louis, and 11.00c, New York, are in substantial volume. Consumers now are anxious to buy on a flat price basis, whereas only a few months ago the bulk of business was being consummated on the basis of the average price when delivery was made.

Demand for lead has come from all classes of consumers, including storage battery makers, manufacturers of lead sheet and pipe, solder, lead-covered cables and other consuming fields. A number of lead users who had been buying on a hand-to-mouth basis have returned to the market.

At the close of the week, most producers had waiting lists of customers whose needs have not been fully covered.

Production Gains—Heavy demand for the metal has completely nullified the effects of the industry's statistical showing for March. Stocks of lead at refineries at the close of that month totaled 88,581 tons, an increase of 9438 tons over the Feb. 28 total. Production increased to 49,104 tons in March from 41,670 in the preceding month, while shipments amounted to 22,358 tons compared with 21,855.

Needs Top Domestic Supply

New York — Demand for copper currently is as high as anyone can expect, so that it is necessary to import an average of 25,000 tons a month, says K. C. Brownell, president, American Smelting & Refining Co. Stocks of copper at refineries, aggregating only 60,000 tons are at an almost irreducible minimum.

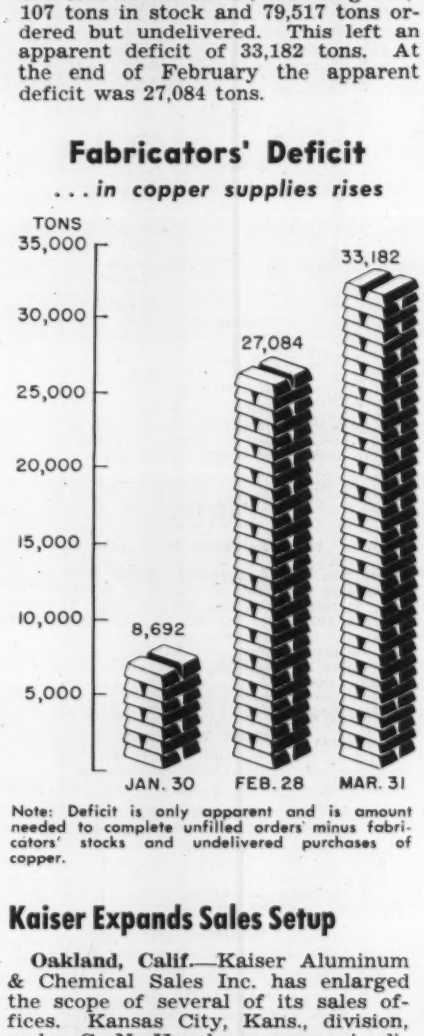
There was a substantial increase in consumer inventories of copper during March, even though the amount used in products shipped showed a moderate gain over February deliveries. Copper content of products shipped in March from plants of makers of copper goods aggregated 106,644 tons compared with 102,896 tons in February.

At the same time, manufacturers of copper and copper-alloy products received considerably more copper from producers than was used in March, so that their stocks of the metal increased 17,183 tons to a total of 381,107 tons on Mar. 31. The receipt of new copper during the month totaled 123,334 tons compared with 114,856 tons in February.

Fabricators' copper requirements at the end of March totaled 493,806 tons, including 293,311 tons for working stocks and 200,495 tons for unfilled orders. To meet these needs, they had on hand or on order 460,624 tons of the metal, including 381,107 tons in stock and 79,517 tons ordered but undelivered. This left an apparent deficit of 33,182 tons. At the end of February the apparent deficit was 27,084 tons.

Fabricators' Deficit

. . . in copper supplies rises



Note: Deficit is only apparent and is amount needed to complete unfilled orders minus fabricators' stocks and undelivered purchases of copper.

Kaiser Expands Sales Setup

Oakland, Calif.—Kaiser Aluminum & Chemical Sales Inc. has enlarged the scope of several of its sales offices. Kansas City, Kans., division, under G. N. Houck, manager, is divided into two sales districts, with R. E. Hanson appointed Kansas City district manager to supervise the Kansas City, St. Louis and Wichita, Kans., offices; W. R. Lindman, Dallas, Tex., manager to direct the Dallas and Houston offices.

Two sales districts are created in the Chicago division, which is headed by M. D. Eisele. G. C. Anderson is district manager of the Chicago office and V. J. Kern, Milwaukee district manager.

G. W. Kurachek, formerly sales representative at Rochester, N. Y., is named New York district manager under G. P. Oldham, eastern divisional sales manager.

Atlanta sales office is made a district office under the management of Howard C. Holmes. J. J. Reoch, formerly in the Philadelphia district office, is named to head the Rochester branch office.

Nickel Sales Continue High

1949 volume in United States and Canada exceeds prewar average by 70 per cent

Toronto—Total sales of nickel in all forms by International Nickel Co. of Canada Ltd. declined to 209,292,257 pounds in 1949 from 240,098,274 pounds in 1948 but showed an increase over the 205,278,868 pounds for 1947.

While the volume of sales last year in the United States and Canada was down from the preceding year, it exceeded the average of the prewar years 1936 through 1939 by about 70 per cent, says Robert C. Stanley, chairman of the board. Outstanding were the increases in platers' supplies and in that proportion of the steel industry's requirements represented by the stainless steels. "Volume in these classes was 160 per cent higher than in the prewar years mentioned," he said.

"Consumption of nickel in Great Britain remained at about the same level as in 1948. Usage by the steel industry increased by 13 per cent which was offset by lower amounts for coinage and anodes. Compared with the prewar period, the consumption in Great Britain has gone forward over 35 per cent.

"Deliveries to continental Europe were about double those of 1948 despite currency difficulties. However, the disruptions caused by the war continue to adversely affect the consumption of nickel in continental Europe and have limited deliveries in these markets to 40 per cent of the prewar average. The last year has again witnessed Germany as an important consuming market."

Deliveries of refined copper by the company amounted to 221,075,080 pounds in 1949 compared with 219,130,830 pounds in 1948. The company's cobalt recovery at Port Colborne, Ont., is being increased at a time when there is great interest in the metal for products such as alloys for jet engines, medicinal and other applications. Selenium deliveries in 1949 were 117,636 pounds compared with 103,687 pounds in 1948. A total of 9191 pounds of tellurium was sold in 1949 against 12,608 pounds in the preceding year.

Thorough study is being given by the company to methods which will permit output of high grade by-product iron ore.

Aluminum Co. of America

Pittsburgh — Aluminum Co. of America, this city, does not have a very large order backlog at the present time, says Roy A. Hunt, president. This is not because business is not available, but because the company "does not solicit or take orders far in advance." The company has a limit of three months on advance orders. It follows this policy because when price advances occur customers with advance orders expect to get their aluminum at the old price, Mr. Hunt says. The company expects to "chalk up better sales and earnings in 1950 than it did last year."

NONFERROUS METALS

(Cents per pound, carlots, **except as otherwise noted**)

Primary Metals

Copper: Electrolytic 19.50c, Conn. Valley; Lake, 19.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 17.75-18.75c; 88-10-2 (No. 215) 25.75c; 80-10-10 (No. 305) 22.25c; No. 1 yellow (No. 405) 15.25-16.50c.

Zinc: Prime western 11.00c; brass special 11.25c, intermediate 11.50c, East St. Louis; high grade 12.10c delivered.

Lead: Common, 10.80c; chemical, 10.90c; corroding, 10.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.00-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25-17.50c; grade 2, 16.50-16.75c; grade 3, 15.25-15.50c; grade 4, 14.50-14.75c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 76.75c; May del. 76.00c; June del. 75.50c; July del. 75.25c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 19.50-cent copper.)

Sheet: Copper 33.18; yellow brass 29.61; commercial bronze, 95%, 33.08; 90%, 32.58; red brass, 85% 31.56; 80%, 31.07; best quality, 30.51; nickel silver, 18%, 43.04; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 29.03; cold-drawn 30.28; yellow brass free cutting, 23.99; commercial bronze, 95% 32.77; 90% 32.27; red brass 85% 31.25; 80% 30.76.

Seamless Tubing: Copper 33.22; yellow brass 32.62; commercial bronze 90% 35.24; red brass 85% 34.47; 80% 33.98.

Wire: Yellow brass 29.90; commercial bronze, 95% 33.37; 90% 32.87; red brass, 85% 31.85; 80% 31.36; best quality brass 30.80.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.54c, l.c.l. 24.17, c.l. 23.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.60, l.c.l. 26.35, c.l. 25.85; magnet, delivered, 15,000 lb or more 29.50, l.c.l. 30.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	48.0	....	....
0.156-0.203	41.0	....	....
0.219-0.313	38.0	....	....
0.344	37.0	....	47.0
0.375	36.5	45.5	44.0
0.406	36.5	....	....
0.438	36.5	45.5	44.0
0.469	36.5	....	....
0.500	36.5	45.5	44.0
0.531	36.5	....	....
0.563	36.5	....	41.5
0.594	36.5	....	....
0.625	36.5	43.0	41.5
0.656	36.5	....	....
0.688	36.5	....	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	....	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	....	36.5
1.625	33.5	....	36.5
1.688-2.000	33.5	....	....
2.125-2.500	32.5	....	....
2.625-3.375	31.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $15.75 per cwt; add 50c per cwt. 10 sq ft to 140 sq ft. Pipe: Full coils, $15.75 per cwt. Traps and bends; List price plus 37%.

ZINC

Sheets, 16.75c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 16.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 15.00c; over 12-in., 16.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 29.84c; oval 29.34c; cast 27.87½c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 46.50c, under 1000 lb 48.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 94.00c; 500 to 999 lb, 94.5c; 200 to 499 lb, 95.00c; less than 200 lb, 96.5c, ball, 1000 lb and over, 96.25c; 500 to 999 lb, 96.75c; 200 to 499 lb 97.25c; less than 200 lb, 98.75c, f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.7c; 100 or 300 lb drums only, 100 to 500 lb, 51.4c; 600 to 1900 lb, 49.0c; 2000 to 9900 lb, 47.3c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 40.00c, 10 or more drums 38.00c, f.o.b. Niagara Falls, N. Y.; 41.25c and 39.25c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	16.50	16.50	15.75
Yellow Brass	13.37½	13.12½	12.12½
Commercial Bronze			
95%	15.50	15.25	14.75
90%	15.25	15.00	14.50
Red brass			
85%	15.00	14.75	14.25
80%	14.62½	14.37½	13.87½
Best Quality (71-80%)	14.25	14.00	13.50
Muntz Metal	12.37½	12.12½	11.62½
Nickel, silver, 10%	15.37½	15.12½	7.68¾
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.75	12.50	12.00
Manganese bronze	12.75	12.50	11.87½

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 16.00; No. 2 copper 15.00; light copper 14.00; composition red brass 13.50-13.75; radiators 11.00; heavy yellow brass 10.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 16.00; No. 2 copper 15.00; light copper 14.00; refinery brass (60% copper) per dry copper content 14.75-15.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 14.25-14.50; No. 2 13.25-13.50; light copper 12.25-12.50; No. 1 composition red brass 11.75-12.00; No. 1 composition turnings 11.00-11.25; mixed brass turnings 7.00-7.25; new brass clippings 11.25-11.75; No. 1 brass rod turnings 10.00-10.25; light brass 7.00-7.25; heavy yellow brass 7.75-8.00; new brass rod ends 10.50-10.75; auto radiators, unsweated 9.00-9.25; cocks and faucets, 9.50-9.75; brass pipe 9.75-10.00.

Lead: Heavy 8.50-8.75; battery plates 4.25-4.50; linotype and stereotype 9.00-9.25; electrotype 8.50-8.75; mixed babbitt 8.00-8.25.

Zinc: Old zinc 5.25-5.50; new die cast scrap 5.25-5.50; old die cast scrap 3.75-4.00.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.00-10.50; old sheets 7.00-7.50; crankcase 7.00-7.50; borings and turnings 4.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. 26-27	19.50	10.80	11.00	76.75	17.00	24.50	40.00	71.75
Apr. 25	19.50	10.55	11.00	76.75	17.00	24.50	40.00	71.75
Apr. 24	19.50	10.55	11.00	77.00	17.00	24.50	40.00	71.75
Apr. 21-22	19.50	10.55	11.00	77.625	17.00	24.50	40.00	71.75
Apr. 20	19.50	10.55	11.00	77.50	17.00	24.50	40.00	71.75
Apr. 19	19.50	10.30	11.00	77.00	17.00	24.50	40.00	71.75
Apr. 18	19.50	10.30	10.50	76.75	17.00	24.50	40.00	71.75
Apr. 17	18.50	10.30	10.50	77.50	17.00	24.50	40.00	71.75
Apr. 14-15	18.50	10.30	10.50	76.75	17.00	24.50	40.00	71.75
Apr. 12-13	18.50	10.30	10.50	76.50	17.00	24.50	40.00	71.75
Apr. 11	18.50	10.30	10.50	76.25	17.00	24.50	40.00	71.75
Apr. 6-10	18.50	10.30	10.50	76.00	17.00	24.50	40.00	71.75
Apr. 5	18.50	10.30	10.50	75.375	17.00	24.50	40.00	71.75
Apr. 3-4	18.50	10.30	10.50	74.75	17.00	24.50	40.00	71.75
Apr. 1	18.50	10.30	10.25	74.75	17.00	24.50	40.00	71.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Apr. 27, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Apr. 27	$30.17
Apr. 20	29.50
Mar. 1950	28.23
Apr. 1949	24.06
Apr. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$34.00*
No. 2 Heavy Melt.	*30.00-31.00*
No. 1 Busheling	*34.00*
No. 1 Bundles	*34.00*
No. 2 Bundles	*27.00-28.00*
No. 3 Bundles	*25.50-26.50**
Heavy Turnings	*32.00-32.50*
Machine Shop Turnings	*24.50-25.50†*
Mixed Borings, Turnings	*24.50-25.50†*
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	25.00-26.00
Low Phos. Steel	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	36.00-37.00
Heavy Breakable Cast	32.50-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*35.50-36.50*
Axles	36.50-37.00
Rails, Random Lengths	*38.00-39.00*
Rails, 2 ft. and under	39.50-40.50
Rails, 18 in. and under	40.50-41.50
Railroad Specialties	37.00-37.50
Angles, Splice Bars	39.00-40.00*

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$30.00-30.50
No. 2 Heavy Melt. Steel	28.00-28.50
No. 1 Busheling	30.00-30.50
No. 1 Bundles	30.00-30.50
No. 2 Bundles	24.50-25.00
Machine Shop Turnings	20.50-21.00
Mixed Borings, Turnings	23.50-24.00
Short Shovel Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Low Phos.	31.00-31.50

Cast Iron Grades

No. 1 Cupola	44.00-44.50
Charging Box Cast	38.50-39.50
Stove Plate	36.00-37.00
Heavy Breakable Cast	33.00-33.50
Unstripped Motor Blocks	31.50-32.50
Brake Shoes	29.50-30.50
Clean Auto Cast	44.50-45.50
No. 1 Wheels	37.50-38.00
Burnt Cast	33.50-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.50-34.00
R.R. Malleable	39.50-40.00
Rails, 3 ft and under	42.00-43.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	39.00-40.00
Cast Steel	35.00-36.00
Railroad Specialties	36.00-36.50
Uncut Tires	37.00-38.00
Angles, Splice Bars	41.50-42.00

VALLEY

No. 1 Heavy Melt. Steel	$33.50-34.00
No. 2 Heavy Melt. Steel	31.00-32.00
No. 1 Bundles	33.50-34.00
No. 2 Bundles	26.50-27.50
Machine Shop Turnings	23.00-24.00
Short Shovel Turnings	25.50-26.00
Cast Iron Borings	25.50-26.00
Low Phos.	34.50-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.50-35.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$27.00*
No. 2 Heavy Melt. Steel	*25.00*
No. 1 Busheling	*26.00*
No. 1 Bundles	*27.00*
No. 2 Bundles	*21.50*
Machine Shop Turnings	*19.00*
Short Shovel Turnings	*21.00*
Mixed Borings, Turnings	*17.00-18.00*
Low Phos. Punchings and Plate, elec. fur. grade	30.00-31.00
Low Phos. Plate, 5 ft & Under	29.00-30.00
Elec. Furnace Bundles	27.00
Heavy Turnings	27.00-28.00
No. 1 Chemical Borings	30.00
Knuckles and couplers	32.00-34.00
Steeel car wheels	*34.00*

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.00-39.00
No. 1 Yard Cast	34.00
Charging Box Cast	36.00
Heavy Breakable Cast	36.00
Unstripped Motor Blocks	29.00
Clean Auto Cast	38.00
No. 1 Wheels	40.00
Malleable	39.00-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	*$31.00*
No. 2 Heavy Melt. Steel	*25.00*
No. 1 Busheling	*31.00*
No. 1 Bundles	*31.00*
No. 2 Black Bundles	*25.00*
No. 3 Bundles	19.00
Machine Shop Turnings	*16.00*
Short Shovel Turnings	*19.00*
Mixed Borings, Turnings	*18.00*
Cast Iron Borings	*19.00*

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	36.00
Stove Plate	*30.00*
Heavy Breakable Cast	35.00
Unstripped Motor Blocks	*27.00*
Brake Shoes	24.00
Clean Auto Cast	42.00
Drop Broken Cast	*45.00*

Railroad Scrap

No. 1 R.R. Heavy Melt	*33.00*
R.R. Malleable	*36.00*
Rails, Rerolling	*42.00*
Rails, Random Lengths	37.50
Rails, 18 in. and under	45.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$23.00-23.50
No. 1 Bundles	*30.50-31.00*
No. 2 Bundles	*20.00-21.50*
No. 1 Busheling	*29.50-30.00*
Machine Shop Turnings	*17.50-18.00*
Mixed Borings, Turnings	*17.50-18.00*
Short Shovel Turnings	*21.00-21.50*
Cast Iron Borings	*21.00-21.50*
Punchings & Plate Scrap	*29.50-30.00*

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
Heavy Breakable Cast	*31.00-32.00*
Clean Auto Cast	*41.00-42.00*

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	26.00-26.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	30.50-31.00

Cast Iron Grades

No. 1 Machinery	37.00-38.00
No. 1 Cupola	33.00-34.00
Stove Plate	31.50-32.50
Malleable	32.50-33.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$23.50-24.50*
No. 2 Heavy Melt. Steel	*19.50-20.00*
No. 1 Busheling	*20.50-21.50*
No. 1 Bundles	*23.50-24.50*
No. 2 Bundles	*18.00-18.50*
Machine Shop Turnings	*14.00-14.50*
Mixed Borings, Turnings	*14.00-14.50*
Short Shovel Turnings	*14.50-15.00*
Punchings & Plate Scrap	*26.00-26.50*
Low Phos. Plate, 5 ft & under	*26.00-26.50*
Elec. Furnace Bundles	*23.50-24.50*

Cast Iron Grades

No. 1 Cupola Cast	*28.00-28.50*
No. 1 Machinery	*29.50-30.50*
Charging Box Cast	*29.00-30.00*
Heavy Breakable	*29.00-30.00*
Unstripped Motor Blocks	*22.00-22.50*
Malleable	*35.50*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$22.50-23.00*
No. 2 Heavy Melt. Steel	*19.00-19.50*
No. 1 Bundles	*22.50-23.00*
No. 1 Busheling	*21.50-22.00*
Machine Shop Turnings	*14.00-14.50*
Mixed Borings, Turnings	*14.00-14.50*
Short Shovel Turnings	*15.50-16.00*
Bar Crops and Plate	*24.00-24.50*
Punchings & Plate Scrap	*24.00-24.50*
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	*29.00-30.00*
Mixed Cast	*25.50-26.50*
Heavy Breakable Cast	*29.00-30.00*
Stove Plate	*22.50-23.00*

CHICAGO

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	27.00-28.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.00
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	22.00
Cast Iron Borings	20.00-21.00
Low Phos.	32.00-33.00
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	24.00-25.00
Cut Structurals	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	37.00-38.00
Stove Plate	32.50-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00
Malleable	42.00-43.00
Rails, Rerolling	46.00-47.00
Rails, Random Lengths	36.00-37.00
Rails, 2 ft and under	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	38.00-39.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
No. 2 Bundles	20.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	27.00-28.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
Stove Plate	30.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	nominal
Angles and Splice Bars	nominal

ST. LOUIS

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	*27.00-28.00*
Machine Shop Turnings	*17.00-18.00*
Short Shovel Turnings	*19.00-20.00*

Cast Iron Grades

No. 1 Cupola Cast	37.00-39.00
Charging Box Cast	32.00-33.00
Heavy Breakable Cast	31.00-32.00
Brake Shoes	31.00-32.00
Clean Auto Cast	36.00-38.00
Burnt Cast	30.00-31.00

Railroad Scrap

R.R. Malleable	34.00-35.00
Rails, Rerolling	*45.00-46.00*
Rails, Random Lengths	34.00-36.00
Rails, 3 ft and under	39.00-40.00
Uncut Tires	30.00-31.00
Angles, Splice Bars	36.00-37.00
Railroad Specialties	32.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	26.00

Cast Iron Grades

No. 1 Cupola Cast	34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	*$27.00*
No. 1 Bundles	*27.00*
Mechanical Bundles	*25.00*
Mixed Steel Scrap	*23.00*
Mixed Borings, Turnings	*20.00*
Rails, Remelting	*27.00*
Rails, Rerolling	*30.00*
Busheling	*21.50*
Bushelings new factory, prep'd	*25.00*
Bushelings new factory, unprep'd	*20.00*
Short Steel Turnings	*20.00*

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets Strip . . .

Sheet and Strip Prices, Page 141 & 142

Boston—Pressure for placement of third quarter orders for flat-rolled is increasing on broader base. On numerous sheet and strip products specifications extend into August-September and point to some inventory coverage.

New York—Reduction in freight rates May 1 on a number of steel items is expected to have little bearing immediately on sheet demand. Consumers will continue to place orders wherever they can.

Pressure is strong not only for major grades but for enameling stock and such specialties as electrical sheets and stainless products.

Philadelphia—Bethlehem Steel Co. books are filled for third quarter on all the major grades and on certain specialties, notably electrical sheets. Other sheet sellers have opened books for the period or are considering doing so.

In their desire to get in tonnage as fast as possible many sheet consumers may not go far in attempting to rearrange shipping schedules so as to obtain the full advantage of the lower rail rates.

Reflecting current high pressure are gray market offerings. One consumer in this district countered a price on cold-rolled sheets—any gage—of 8.25c f.o.b. Detroit, with an offer of 7.75c, but failed to get any of the tonnage. One re-seller has offered 200 tons of 20 gage cold-rolled sheets at 8.00c f.o.b. Pittsburgh and another has offered cold-rolled in any gage at 9.00c f.o.b. Pittsburgh.

Pittsburgh—Pressure for sheet and strip deliveries continues. Many customers contend mill allotments are either retarding production schedules or preventing desired increases in them. Modernization and installation of additional facilities has aided measurably in meeting flat rolled steel demand.

Cleveland — Continued strong demand for sheets and strip persists. Producers are booked so heavily ahead little new tonnage will be available for third quarter unless important order cancellations are received. Some apprehension is felt on this latter score in view of the threatened labor difficulties in the automotive industry late in this quarter.

Except for occasional changes in extra cards the market has held firm at price levels established early in the year. Most recent change in extras was by Republic Steel Corp. on its electro paintlok, zincbond and nevapeel brand sheets. Heretofore these were sold on a weight gage basis predicated on a hot-dipped galvanized sheet formula. To eliminate confusion, the company has discontinued this practice and in its place adopted the procedures and practices in effect on cold-rolled sheets.

Cincinnati—Sheet mills are pushing production in efforts to meet demands. Conservative scheduling for the current quarter may eliminate excessive carryover, but inquiries point to a wide gap between needs and output in third quarter.

Chicago — Above-capacity operations at steel mills is enabling a few users to replenish inventories. However, sheet and strip supplies are tight and auto makers continue their pressure.

Heavy appliance makers are operating below capacity due to steel shortage. Farm implement makers have scheduled production boosts, but are uncertain whether steel quotas will permit attainment of goals

St. Louis — Calls for cold-rolled sheets are increasing. Producers are planning operations on the basis of good demand throughout the year. Production has been practically at capacity for several months. Consumers are "lining up" for third quarter bookings.

Birmingham — Sheets remain in short supply. Galvanized are practically sold out through the second or possibly the third quarter. Demand for lighter gages of cold-rolled remains unusually heavy.

Los Angeles — Increasing demand for flat-rolled products in virtually all categories is noted. Stainless sheet, for the first time in months, is tightening up as a result of considerable activity among fabricators working on atomic energy projects.

San Francisco — Demands for hot-rolled sheets are increasing sharply and supplies are tightening. Cold-rolled sheets also are in short supply. The situation hasn't reached an "acute" stage, but small sheet metal shops are being pinched badly.

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Tin Plate . . .

Tin Plate Prices, Page 142

Pittsburgh—Trend toward greater consumption of electrolytic tin plate is further illustrated by decision of Jones & Laughlin to increase output at Aliquippa works. Other electrolytic expansion programs involving new lines have been announced by several other producers. These programs will increase industry's electrolytic capacity in excess of 650,000 tons annually.

Steel Bars . . .

Bar Prices, Page 141

Boston—Heavier carbon steel buying has filled most bar mill schedules through June on sizes 1½-inch and under, while some volume is being booked for third quarter. High-sulphur bessemer schedules for July are filling rapidly. Both Springfield and Watertown armament shops are buying more steel. Textile mill equipment builders and some other consumers are placing supplemental second-quarter orders.

Boston — Mid-West Forge Co., Cleveland, booked 27,500 alloy steel barrel blanks for Springfield Armory at $2.80 each, delivered.

New York—Under the new freight rate schedules effective May 1, hot carbon bar consumers will pay a rate of 50 cents a hundred pounds from Pittsburgh to this city, as against 62 cents; 42 cents from Johnstown, Pa., as against 54 cents; and 46 cents from Buffalo, as against 58 cents.

Demand is well sustained, and mill backlogs are becoming more extended. Some producers are sold through July on the smaller sizes, although some tonnage for early June delivery is still available in the larger sizes.

Philadelphia — Leading sellers of hot carbon bars are sold out through July and most of August. It is difficult for consumers to get any tonnage against new orders, even in the very large sizes, for delivery this quarter. Demand is diversified and generally heavier.

Reduction in rail rates, effective May 1, on bars and some other products has caused consumers to propose a consolidation of some of their shipments to take full advantage of the change.

Pittsburgh—While unbalanced supply-demand relationship of bars is not so critical as in sheets and strip, sellers are distributing them on an allotment basis. They do not anticipate any easing in customer pressure throughout second quarter. Sellers note increased activity on part of farm implement concerns, while heavy demand persists from forge shops and screw machine interests.

Cleveland — Merchant bar sellers hold substantial orders; deliveries are lengthening. Carryover into third quarter is expected to be substantial. While supply is tightening, conditions in this market are not comparable with the scarcity prevailing in the flat-rolled products. Alloy bar tonnage is available for fairly early shipment.

Chicago—Some bar mills have carryovers through July. Forge shops are operating at high levels, held below capacity in some instances only by hot-bar stringency. Cold-finished bars are active and alloys appear to require only slightly less delivery delay than carbon. Automotive and implement requirements are high. Quotas generally are on a monthly basis.

Los Angeles — Bar demand shows very little improvement. Columbia Steel Co. is able to ship from plant inventories in some sizes and has open time on its books for May and June rolling. The same situation is true at Kaiser Steel Corp.'s Fontana plant.

Wire . . .

Wire Prices, Page 143

Boston—With most specialty capacity booked through this quarter, orders for the third quarter are going to wire mills in undiminished volume. Demand is diversified and pressure from automotive consumers is unabated. There are few openings for manufacturer's wire left before July.

Birmingham—Activities stimulated by warmer weather are aggravating a tight situation in wire products, especially woven wire fencing. Some items in nails are hard to get and there is a consistent need for manufacturers' wire.

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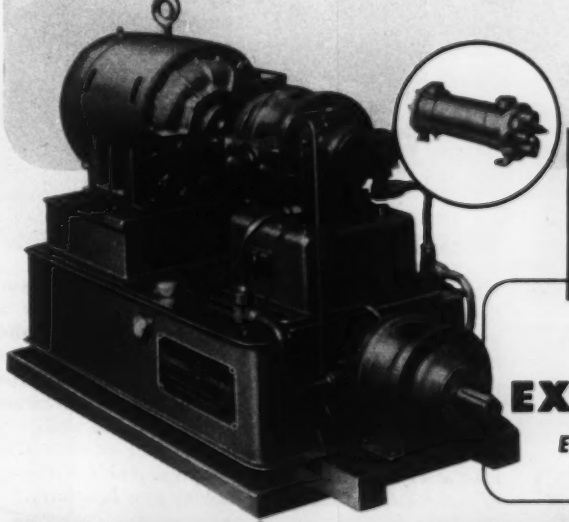

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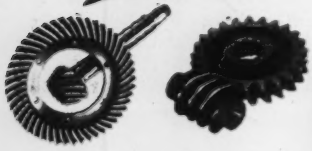

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Tubular Goods . . .

Tubular Goods Prices, Page 144

Boston—While direct sales of pipe are slightly more active, distributors' sales are light for this season. Current allocations of butt weld for May and June are not fully specified, although latter month is likely to show ultimate improvement due to inventory depletions. An oil pipe line, New Haven, Conn.-Springfield, Mass., six-inch, will be constructed in connection with a storage terminal, Gulf Oil Co. at Springfield.

Boston—Low on 118,240 ft of steel tubing for the Springfield Armory is Edgecomb Co., Milford, Conn., at 10.50c per foot.

Pittsburgh—Demand for oil country goods is heavier with delivery promises extended about four weeks. Producers of large diameter transmission line pipe are booked into 1954. Jobbers' inventories of standard pipe are better balanced, although delivery pressure continues heavy. Jones & Laughlin plans to install a continuous butt weld mill for production of small diameter pipe under ½-inch at Aliquippa, Pa.

Los Angeles—Skelp shortage is hampering pipe producers. Bidding among suppliers is erratic. On a job at Point Mogu, Calif., bids ranged from $800,000 to $1.5 million.

Plates . . .

Plate Prices, Page 141

Boston—With orders heavier, plate mill deliveries are lengthening, some units being booked through balance of this quarter with scattered tonnage falling into July. More work is in the offing, notably large tanks for oil storage terminals. Chicago Bridge & Iron Co. booked part of tanks to be erected at the Pocahontas Fuel Co., Portland, Me., terminal.

Boston—Navy is taking bids on around 3000 tons of hull plates, delivered to various yards. Bulk of tonnage is to be bid May 11.

New York—Plate business is gaining. Miscellaneous tank requirements show the best improvement; railroad requirements are more active; ship work remains exceedingly dull; very little is coming out for oil refinery work. Most eastern producers can promise deliveries in a month on the heavier gages and six to eight weeks on the lighter.

Eastern operations are being helped somewhat by the overflow of demand from the Middle West, especially for fabricated pipe work.

Philadelphia—While some plate mills can still make deliveries on heavy gages within five weeks and can still do nine weeks on the lighter gages, ¼ and under, the market is tightening. One large eastern producer has virtually nothing to offer in the current quarter, while a leading Pittsburgh mill has nothing to sell before August delivery.

Birmingham—Pressure for plates continues. In addition to the effort to accumulate stocks at Bessemer where carbuilding has been resumed, need for plates for tanks and miscellaneous uses is considerable. No real relief is expected before the end of the year, if then.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Boston—Despite mounting heavy demand, concrete reinforcing bar prices are on the soft side; contractors' quotations in engineering estimates average 9 to 10 cents per pound in place, but they buy bars at prices under normal spread ratio.

Philadelphia—Reinforcing bar inquiry is active. Large tonnages are being figured. Reduced rail rates on minimum carlots of 80,000 pounds, effective May 1, apply to reinforcing bars in lengths not exceeding 30 ft. Stock lengths usually measure around 60 ft.

Pittsburgh—Bulk of new inquiries for reinforcing bars is for municipal and federal projects. Highway construction programs are particularly active. Some improvement in demand for plant expansion is noted, but in general volume of private work remains depressed. Rail steel bar interests are fairly active.

Los Angeles—Reinforcing demand is steady; supplies, more than adequate. Competition is increasing constantly, with northern mills making a considerable dent in this market by absorbing up to $12 per ton in freight to meet local prices. Whittier Narrows Flood Control project is under construction and will require 3450 tons of reinforcing bars. It will cost more than $36 million.

San Francisco — Although demand has picked up slightly, supplies of reinforcing bars are fairly plentiful.

Seattle — Plants are increasing stocks of both reinforcing and merchant bars. A substantial volume of new business is in prospect. Demand for small tonnages continues strong and estimating forces are busy on proposed projects.

Structural Shapes . . .

Structural Shape Prices, Page 141

Boston—Deliveries on plain structural material are more extended and prices for fabricated tonnage are better stabilized; rolling schedules are filled into June with limited openings for that month; some volume is being booked for July.

New York—While new orders for shapes are not heavy, considerable construction work is active. Several large projects are pending for the New Jersey Turnpike Authority. Backlogs of most fabricators are increasing. Delivery promises by mills are being extended. Shapes are not affected by the reduction in freight rates which is effective May 1.

Philadelphia — While public work still dominates structural market, private activity is improving and should continue to gain well into the summer. Fabricating shop backlogs likely will undergo further expansion. However, competition for current business is still keen.

Philadelphia—Shape deliveries are more extended. One large producer can accept some tonnage for late June; another is booked up to August. Diversion of steel to other products, under heavy consuming pressure, is partially responsible for this situation.

Cleveland — Numerous small jobs are keeping local fabricators busy though price cutting on fabricated work is causing some interests to withhold bids on certain work. Substantial number of projects is before the market, most of them of a public nature. However, private work is expanding. The Mt. Vernon Bridge Co., Mt. Vernon, O., was low bidder at $1,106,395 on a bridge across the Cuyahoga river at Cleveland for the New York Central Railroad. Bates & Rogers Construction Co. was low on the bridge superstructure at $432,-034.

Chicago—Of all the metalworking industries, the best fixed for steel are shape fabricators which have fair stocks. Those of wide flange beams are low, but plain material abounds in many shops. Fabricators are depending heavily on substantial pickup in projects. Bids under estimates are bringing to life projects that have been waiting for prices to come down; these may have a stabilizing effect.

San Francisco — Buying of structural shapes is mounting slowly and some tightness is reported in heavy items. Even greater demand is forecast for early summer.

Seattle—Fabricators have backlogs that will carry to the end of the quarter. New business is being sought. Increasing competition from outside plants is apparent.

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Tool Steel . . .

Tool Steel Prices, Page 143

Pittsburgh—Upturn in tool steel orders continues with producers maintaining production at about 80 per cent of capacity. Inventories are adequate to meet requirements. Projected high level of metalworking operations over coming months is expected to sustain present production.

Pig Iron . . .

Pig Iron Prices, Page 140

Boston—Pig iron shipments in April increased slightly, but most foundries are operating with limited backlogs. Lack of automotive volume in district shops is one handicap. District furnace is shipping production, but has geared down production to demand level.

New York—Demand for ferrous castings is leveling off. Some pig iron sellers here doubt if their shipments will exceed those in March. Pig iron production is at the highest level this year; hence adequate supply is available in an increasing number of grades. With prices of foreign iron several dollars a ton under domestic offerings, importers are selling some basic as well as foundry iron. Basic is offered at around $40 duty paid. Most imports are coming from Holland.

Buffalo—Better sentiment is apparent in the merchant pig iron trade as leading sellers report sustained improvement in demand. Fresh buying is reported from a number of large melters. In addition, large tonnages continue to move out of here for Michigan casters.

Pittsburgh — Supply of merchant iron is adequate to sustain current production schedules of most foundry groups. However, a slight improvement in activity among small jobbing shops is noted which, if developed into definite upward trend, would create critical foundry iron shortage. Pittsburgh Steel blew in its 400-ton unit late last week. Only 3 out of 47 units are idle here.

Cleveland — Pig iron is moving steadily to foundries on contracts. Some new buying is reported with foundry operations rising. Supply conditions are satisfactory though producers are shipping every pound of metal produced. Noticeable improvement in foundry activity has resulted in a lengthening of the work-week.

Chicago—With the blowing in of Inland Steel Co.'s No. 4 blast furnace May 1 the district will have 39 units out of 42 in operation. The Inland stack will produce malleable iron in a brief campaign before switching to basic. Inland anticipates a seven-furnace operation, taking off one stack for relining when the now-idle No. 3 unit comes in.

St. Louis—Pig demand continues heavy, especially for foundry and malleable iron. Small foundries are pressing for fast deliveries to replenish inventories which have long been at the danger point. Koppers' blast furnaces at Granite City, Ill., are running "wide open," but are unable to accumulate ground stocks.

Birmingham—Pig iron needs are not being met adequately in most instances. All merchant facilities are at capacity and indications are there will be no general slackening in demand for the next few months.

Warehouse . . .

Warehouse Prices, Page 145

Boston—Warehouse stocks of carbon sheets fall far short of demand; inventories are low and replacements uncertain. April sales were at the best level thus far this year with most distributors. Galvanized sheets are being sold under two base quantities; one group has a base of three to 24 bundles, deducting 10 cents per 100 pounds, 25 to 49 bundles, and 15 cents, 50 bundles and over; others have a base quantity of one ton.

Philadelphia—Reduction in the rail rates on a number of products in minimum carlots of 80,000 pounds will undoubtedly lead to some revision in warehouse prices.

Cleveland—Several local distributors report April volume will better that of March which was one of the best months they experienced in a long time. Warehouses could do more business in the flat-rolled products if they had the tonnage to sell. Scarcity of these products is driving many normal mill consumers to seek stopgap tonnage from the distributors.

Cincinnati—Distributors are busy, although sales volume is curbed by exhaustion of stocks in sheets, plates and structurals. Mill shipments have been inadequate to provide replacements against active demands.

Los Angeles — Distributor activity continues at good level. Warehousemen are buying cautiously to maintain balanced inventories. Demand has picked up noticeably in plates, bars, and structurals, all of which have been weak until recently. Warehouse prices for cold-rolled sheet are up 30 cents to $7.30 per 100 lb while galvanized sheets are up 5 cents to $7.50.

San Francisco—Distributors report heavy demand for sheets and strip from small fabricators. Meager supplies, and protection of regular customers, are forcing a rejection of most demands.

Seattle — Warehouse turnover shows an increase over March and indications are favorable for the next three months.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 144

Pittsburgh—Oven foundry coke demand is active, but there is a lack of interest in beehive foundry grades. A favorable supply-demand relationship is anticipated throughout second quarter for both coke grades.

Cleveland—Expanding foundry operations are accompanied by increased consumer pressure for coke. Foundries are receiving supplies steadily but they are not getting all the tonnage they would like. Consequently, they are not building up inventories. Coke production is back to normal but oven operators find it necessary to virtually allocate tonnage to customers.

Iron Ore . . .

Iron Ore Prices, Page 145

Cleveland—First iron ore cargo of the 1950 lake shipping season was received here last week. It was destined to the Republic Steel Corp. plant. Slow progress is being made in getting vessels through to the upper lakes loading docks and it doesn't look as though much of a movement will be possible before another week or so. Meanwhile, ore stocks at lower lake furnaces and docks are believed adequate to support present high-level blast furnace operating rate pending new tonnage arrivals from the head of the lakes.

Scrap . . .

Scrap Prices, Page 148

Boston—All grades of steel scrap are from $1 to $1.50 per ton higher. Cast grades are firmer, reflecting some outside buying.

New York—Scrap brokers have advanced prices 50 cents a ton on all grades, including both steel and cast iron. The market in steel grades is the most active in more than two years.

Philadelphia—Demand for open-hearth steel scrap is active with prices up $1 a ton. Turnings and low phos grades are strong but unchanged. Cast grades are in good demand at unchanged prices.

Buffalo—Steady undertone rules the scrap market here. Prices are unchanged as dealers ship against large orders on the books, but a sale of unprepared No. 1 heavy melting scrap was reported at a price which could have been interpreted as being slightly above the prevailing range of $29.50-$30.00 for this grade.

Pittsburgh — Open-hearth scrap quotations have advanced $1 per ton on limited tonnage sales. No. 1 heavy melting dealer scrap is $34. Strength is evidenced by fact brokers are offering to pay up to $35 for No. 1 heavy melting to cover old orders. Reports that mills are paying in excess of $35 are denied by principals. Railroad heavy melting scrap has been sold to mills within range of $35.50 to $36.50.

Cleveland—Undertone of the scrap market is strong. Prices are unchanged since mills have made no new purchases. Brokers are actively covering on old orders.

Detroit—As a result of intensive competitive bidding for scrap tonnage, which is on the low side because of the continued absence of Chrysler material, prices have leaped ahead again by $1.50 to $2 per ton. The amount of "free" scrap which can be bid in for local users is far short of their requirements and the only answer is to push up bidding. Some brokers see the possibility of open-hearth material going to $40 a ton. Ford is talking about a buy and Bethlehem is understood to be interested in about 10,000 tons for shipment to dock here.

Cincinnati—Scrap prices are higher in a strong market. Advances are bringing out considerable tonnage from dealers' yards to augment other available scrap, but all is being absorbed readily. Mills are accepting

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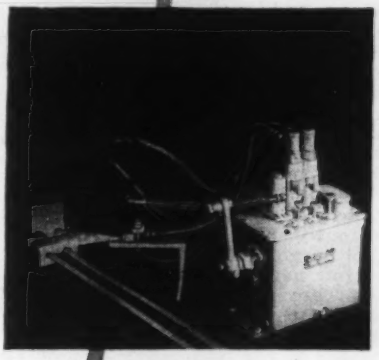

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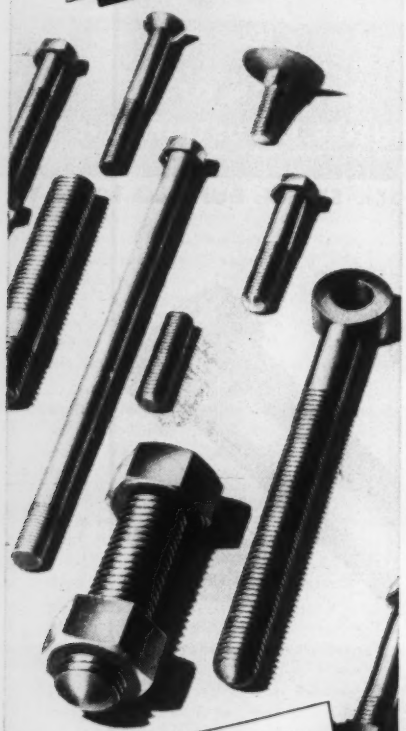

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shipments, on old contracts, to meet heavy melt despite sizable inventories. Foundry buying continues spotty.

Chicago—Scrap is moving on orders placed recently, but failure of one major mill to place new orders came as a blow to the trade and took a little of the steam out of the market. Top grade scrap is tight. Brokers' buying prices are higher. Foundry activity is also on a high plateau and cast scrap is moving well.

St. Louis — Renewed interest is shown in cast scrap. Smaller foundries are filling in stocks both in response to better business and pig iron scarcities. Laclede Steel Co. has placed an order for 25,000 tons of No. 2 heavy melting steel—approximately 45 days' supply—on the basis of $27 to $28, delivered, or $2.50 above previously published quotations. Other large consumers are negotiating for new supplies. Scrap shipments are only fair, but quality is the best in months.

Birmingham—Considerable activity is noted in heavy melting steel scrap and the better grades of cast, but movement of material to local yards is brisk.

Los Angeles—Scrap demand continues light and prices are showing a wobbly undertone. Foundrymen report activity sluggish and are making few commitments for scrap. Little business is being done in electric furnace material or cupola cast.

San Francisco — Firming scrap prices in eastern markets continue to have no influence on western scrap, prices remaining unchanged. Mills are buying only for replenishment purposes and are taking only the best material.

Seattle—Steel scrap prices are firm. The larger users are buying on a hand-to-mouth basis. Practically all current sales involve local scrap, outside shippers finding conditions unattractive. Only prepared scrap is in demand.

Rails, Cars . . .

Track Material Prices, Page 143

Pittsburgh—Freight car shops operated by carriers are more active, in contrast to continued depressed activity among independents. At least one car wheel plant is shut down, while other interests fabricating axles, wheels, etc., expect to clean up backlogs by June 1.

Sweet's Steel Co., Williamsport, Pa., advanced rail steel light rails $4 per ton to $3.75 per 100-pound base.

Canada . . .

Toronto, Ont. — Canadian scrap prices are $2 higher on steel turnings and $3 on all other steel materials. Dealers are not providing a definite price on cast scrap but are quoting a nominal figure of $40 per ton, f.o.b. shipping point.

Demand is at a high level and, while no shortages are reported, neither are there surplus stocks. Scrap from rural districts is not yet appearing on the market; most scrap reaching dealers is from industrial plants and automobile wreckers. Large tonnage importations still are necessary to meet the high consumer demand.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3800 tons, three state bridge projects, Westmoreland and Allegheny counties, Pennsylvania; Brush creek and Plum creek projects going to Bethlehem Steel Co. and the Willow run project to Fort Pitt Bridge Works, Pittsburgh.

3000 tons, Greyhound Bus terminal, Chicago, to American Bridge Co., Pittsburgh.

1300 tons, Samuel Rudin apartment, East End avenue and 83rd St., New York, to Harris Structural Steel Co., that city.

600 tons, machine shop, Atlantic Refining Co., Philadelphia, through Lauter & Co., general contractors, that city, to Belmont Iron Works, Eddystone, Pa.

550 tons, six state bridges, Uxbridge-Douglas, Mass., to American Bridge Co., Pittsburgh; Monroe & Langstroth Inc. North Attleboro, Mass., bridge sub-contractor; G. Rotondi & Sons, Melrose, Mass., general contractor.

400 tons, mill additions, Kendall Mills, Walpole, Mass., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Morton C. Tuttle Co., Boston, general contractor.

315 tons, three-span composite welded girder bridge, clear span 194 ft, Stiles street, New Haven, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; D. V. Frione & Co., Inc., New Haven, general contractor.

125 tons, telephone building, Astoria, New York, to Grand Iron Works, that city.

120 tons, rolled beam bridge, East Hartford-Glastonbury expressway, East Hartford, Conn., to American Bridge Co., Pittsburgh; Brunalle Construction Co., Stonington, Conn., general contractor.

100 tons, two-span rolled beam bridge, Vernon, Conn., to American Bridge Co., Pittsburgh; Brunalle Construction Co., Stonington, Conn., general contractor.

STRUCTURAL STEEL PENDING

3300 tons, viaduct, Moon Island-Long Island, Boston harbor; Merritt-Chapman & Scott Corp., New York, low on general contract, $2,709,951.

7000 tons, state bridge work, Corning, N. Y.; Lane Construction Co., Meriden, Conn., low on general contract.

4000 tons, Dun & Bradstreet office building, Church street, New York; George A. Fuller Co., that city, general contractor.

2375 tons, state bridge work, comprising three schedules, Allegheny county, Pennsylvania; bids May 26.

1700 tons, state bridge work, Mercer and Middlesex counties, New Jersey; P. T. Cox, New York, low on general contract.

500 tons, state hospital, Somerset, Pa.; bids May 3.

500 tons, Du Pont plant, Bloomington, Tex., bids closed Apr. 28.

500 tons, state bridge, Bucks county, Pennsylvania; bids May 12.

435 tons, I-beams, angles and channels, various deliveries, Navy purchasing office, Washington; bids May 9, inv. 3027.

400 tons, including cranes, electrical equipment, conduits, etc., machine, shop, warehouses, heating plant and other utilities; bids to Bureau of Reclamation, Coulee Dam, Wash., June 1; spec. No. 2985.

275 tons, building, Sono Products Co., Mystic, Conn.

250 tons, state bridge, Monmouth county, New Jersey; Reed Contracting Co., Woodbridge, N. J., awarded general contract.

220 tons, state bridges, Salem, Mass.; Thomas Rawson, Woburn, Mass., low on general contract.

200 tons, building, Sears Roebuck & Co., Steubenville, O.; bids May 4.

200 tons, warehouse, Dunham & Hanson, Bangor, Me.

165 tons, twin-span deck plate girder bridge, Gorham, N. H.; bids May 4, State Highway Department, Concord, N. H.

125 tons, two-span rolled beam bridge, Howard avenue, New Haven, Conn.; bids in; work also takes 70 tons of deformed steel reinforcing bars.

115 tons, shapes and bars, two-span rolled beam bridge, Woodward avenue, New Haven, Conn.; bids in.

101 miles of chain link for Philadelphia extension of Pennsylvania turnpike system in Cumberland and Montgomery counties; Turnpike Commission, Harrisburg, closes bids May 17.

100 tons, warehouse, Jordon-Marsh Co., Quincy, Mass.

100 tons, shapes and bars, 165-foot span beam bridge, Farmington river, Avon, Conn.; bids in.

80 tons, including reinforcing, Seattle light department station, Bothell, Wash.; general contract to W. G. Clark Co., Seattle.

Unstated, 32 towers, switch racks and other utilities, addition to Eugene, Oreg., substation; bids to Bonneville Power Administration, Portland, Oreg., May 10.

Unstated, military installations, Takotna and Cape Newenham, Alaska; bids to U. S. Engineer, Anchorage, Alaska, May 24 and 25, respectively.

Unstated, steel storage warehouse, Guild Lake area, Portland, Oreg.; bids in to J. E. Hazelton & Co., Portland, Apr. 22.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1111 tons, store, Indianapolis, for Equitable Life Assurance Society of America, to Wm. B. Pollock Co., Youngstown.

309 tons, Des Plaines interception sewer, Melrose Park, Ill.; to U. S. Steel Supply Co., Chicago.

165 tons, six state bridges, Uxbridge-Douglas, Mass., to Truscon Steel Co., Boston; G. Rotondi & Sons, Melrose, Mass., general contractor.

165 tons, grade separation, Laramie avenue, Chicago; to U. S. Steel Supply Co., that city.

100 tons, headquarters Bureau of Reclamation building, Ephrata, Wash.; W. W. Harfst Co., Seattle, general contractor; materials furnished by Bureau.

REINFORCING BARS PENDING

2500 tons, housing project, Brighton district, Boston; C. J. Maney & Co., Boston, low on general contract.

2100 tons, Veterans Administration research hospital, Chicago; W. E. O'Neil Construction Co. and Kenny Construction Co., contractors.

1130 tons, expressway and bridges, contract two, Olneyville cutoff, Providence, R. I.; bids May 3; work also includes 155 tons, structural steel bridge railing and 51 tons, expansion joints, bridge decks.

1000 tons, Ford Motor Co., Dearborn, Mich., for Cleveland project; bids asked.

680 tons, state bridge work, comprising three schedules, Allegheny county, Pennsylvania; bids May 26.

655 tons, state bridges, Boston-Fall River expressway, Berkley-Raynham-Taunton, Mass.; bids in; work also requires 100 tons of steel piling and 14 tons of wrought iron blast plates.

450 tons, also 75 tons tunnel supports, gates, etc. Keyhole earthfill dam; bids to Bureau of Reclamation, Moorcroft, Wyo., May 23; spec. No. 2983.

435 tons, mostly welded steel wire mesh, runway and connecting taxiways, Warwick, R. I.; M. A. Gammino Construction Co., Providence, R. I., general contractor.

355 tons, machine shop and other utilities; bids to Bureau of Reclamation, Coulee Dam, Wash., June 1; spec. No. 2985.

315 tons, St. Edwards Hospital, Lakewood, O.; bids asked.

155 tons, stadium, Cedar Rapids, Iowa; bids asked.

100 tons, Washington state highway projects; bids to Olympia, May 9.

100 tons, addition to Olympia, Wash., substation; Donald W. Close, Seattle, low

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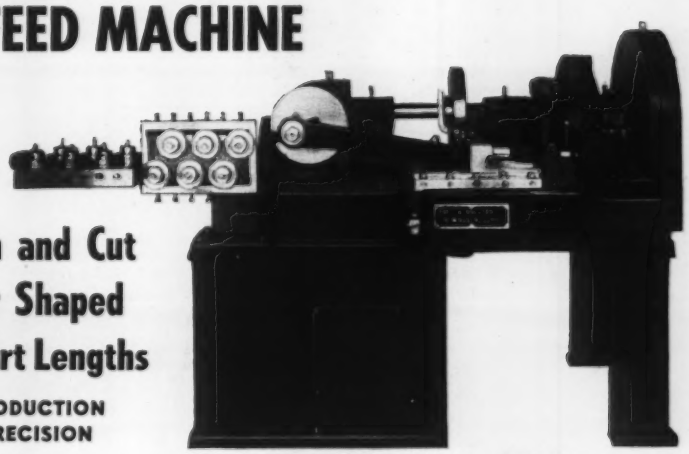

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$127,058, to Bonneville Power Administration.

Unstated, 0.5 million-gallon covered water reservoir; bids to Tacoma, Wash., May 1.

Unstated, Fairview Manor apartments, Fairbanks, Alaska; Nels Mortensen & Co., Seattle, general contract.

Unstated, civic stadium, Spokane, Wash.; Phil McInnis & Henry George & Sons, Spokane, low $713,713 (exceeding funds available.)

Unstated, concrete spillway, etc., earth fill Lookout Point dam, Oregon state; Morrison-Knudsen Co., Peter Kiewit Sons Co. and Macco Corp., joint low $18,699,031.

PIPE . . .

CAST IRON PIPE PLACED

250 tons, 6 inch for Ellensburg, Wash., to unstated interest.

55 tons, 8 and 6 inch for Edmonds, Wash., reported placed with Pacific States Cast Iron Pipe Co., Portland, Oreg.

CAST IRON PIPE PENDING

150 tons, 8000 ft of 8 in. and 10,000 ft of 2 in. cast iron pipe, Class 150, also alternative figures; bids to J. E. Law, city clerk, Port Angeles, Wash., May 1.

PLATES . . .

PLATES PENDING

1824 tons, steel hull plates, various deliveries, Navy purchasing office, Washington; bids May 11, inv. 3047.

842 tons steel hull plates, various deliveries, Navy purchasing office, Washington; bids May 12, inv. 3055.

100 tons plus, 150,000-gal, water tank, Coulee Dam power plant; bids to Bureau of Reclamation, May 23; spec. No. 2989.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Nashville, Chattanooga & St. Louis, 47 diesel-electric locomotives; directors authorize purchase.

Pennsylvania, up to 13,000 freight cars, to be financed under the Equitable plan; inquiries out for 500 to 5000 of 40 ft 6 in. fifty-ton box cars, 500 to 2000 of 50 ft 6 in. fifty-ton box cars, 500 to 2500 of 46 ft seventy-ton gondolas, and 500 to 1000 of 65 ft 6 in. seventy-ton gondolas.

RAILROAD CARS PLACED

Boston Metropolitan Authority, Boston, 40 trolley cars, to St. Louis Car Co., St. Louis.

FERROALLOYS

(*Continued from Page* 145)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c, **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2% contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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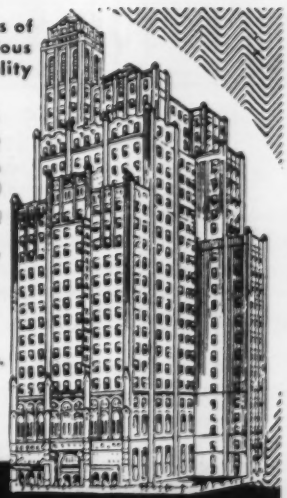

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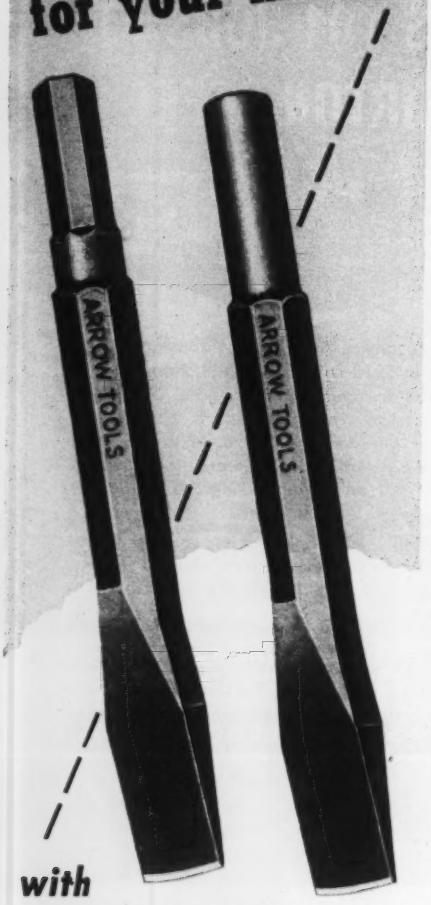

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE
ORGANIZATIONAL CHANGES

Alabama

Signode Steel Strapping Co., Chicago, signed a long-term lease on a building at 926 N. 22nd St., Birmingham. The company will use it as a distribution center at present; will start manufacturing here within the near future.

California

Williams-Wallace Co., San Francisco, building materials firm, will build a $250,000 plant at Belmont, Calif.

California

Extensive renovation is planned for the **Phelan building**, an 11-story downtown San Francisco office building. Cost of the improvements will be approximately $1 million.

California

Continental Can Co., New York, has applied to the Los Angeles Board of Harbor Commissioners to lease a site on Terminal Island for a can plant. Building and equipment would cost about $2 million.

California

Kroehler Mfg. Co., Naperville, Ill., has purchased a building near Pittsburg, Calif., to be used as a furniture plant. Operations are scheduled to begin in July.

Illinois

General Foods Corp., New York, will construct a $1 million warehouse at Kankakee, Ill., adjoining its corn mill and Gaines Dog Food Division plant.

Illinois

Robert W. Rice & Co. Inc.—machinery dealers—moved into new quarters at 210 S. Clinton St., Chicago 6.

Maryland

Three Star Ornamental Iron Co., Brooklyn, Md., equipped about 2000 sq ft of space at Maude avenue and Second street for fabrication and general machine work. R. Schultze is owner.

Maryland

United Iron & Metal Co., with plants at 630 S. Catherine St. and 4201 E. Monument St., Baltimore, is erecting a warehouse building at 4300 Pulaski Highway.

Maryland

Toolcraft Inc., 2411 W. Fayette St., Baltimore, manufacturer of special tools and machinery gages, jigs, dies, etc., will start work shortly on construction of an addition which will more than double its present space.

Maryland

Fingles Co., 2256 Reisterstown Rd., Baltimore, engaged in sheet metal work, has sold its subsidiary, **Majestic Flashing Co.**, to **C. G. Hussey & Co.**, 2860 Second Ave., Pittsburgh. Fingles Co. will equip the space in its plant formerly occupied by Majestic for its regular sheet metal.

Maryland

National Can Co., 811 N. Wolfe St., Canton, Baltimore, acquired 65,000 sq ft in the Colgate warehouse of the **Canton Co.**, Ponca street and Leland avenue. Space will be used for warehousing tin containers.

Maryland

Western Electric Co., 2500 Broening Highway, Baltimore, plans to erect a building for plating work this summer.

Michigan

Leonard Ashbach Co., Brooklyn, N. Y., parent company of **Garod Radio Corp.**, manufacturer of television and radio under the Garod and Majestic trade names, acquired a substantial equity in the **Wilcox-Gay Corp.**, manufacturer of television and recording devices, of Charlotte, Mich. Full production and expansion in the Wilcox-Gay plant is planned as well as continuous full production in Garod's Brooklyn plant.

Minnesota

Stewart Sales Co., Minneapolis, appointed **United States Steel Supply Co.** exclusive distributor of Alhart pattern developer. The manufacturers say Alhart will draw any pattern in about a minute's time, regardless of angle or fitting.

New Jersey

Raybestos-Manhattan Inc., New York, moved its department of marketing and merchandising to 61 Willett St., Passaic, N. J. Franklin A. Miller continues director of this department and is assisted by J. W. Brush Jr.

New Jersey

Chiksan Co., Brea, Calif., is establishing a warehouse stock in the Federal Storage Bldg., 155 Washington St., Newark 2, N. J. Eastern headquarters for Chiksan Co. and Chiksan Export Co. are being transferred from 50 Church St., New York, to the Newark address. The company makes industrial hose, valves, mud guns, joints, etc.

New York

A $2.5 million modernization program, involving installation of machinery at the Buffalo plant of **American Brass Co.**, Waterbury, Conn., is scheduled for the end of 1950.

New York

Metal & Thermit Corp. moved its general offices to 100 E. 42nd St., New York 17.

New York

Rittling Corp., Buffalo, is consolidating its manufacturing operations in Hamburg, N. Y., where it purchased the idle **Applied Optical Industries Inc.'s** plant. Production of heat transfer products will be doubled.

New York

United States Testing Co. Inc.—commercial testing and research—is moving its New York city offices to McGraw-Hill Bldg., 330 W. 42nd St. The office will be managed by Thomas C. Ridgway.

Ohio

Metal Powder Products Inc. is moving its plant to 415 W. Fifth St., Dayton, O. The company manufactures gears, cams and other items from bronze, iron and brass powders.

Ohio

Industrial Associates Inc. has opened its new offices in the Union Commerce Bldg., Cleveland 14. Its Washington address is 1523 L St.

Ohio

Gas Machinery Co., Cleveland, is granted a patent by the British Patent Office relating to the production of oil gas, using various types of process oil and with oil as a fuel for heating. Under this method,

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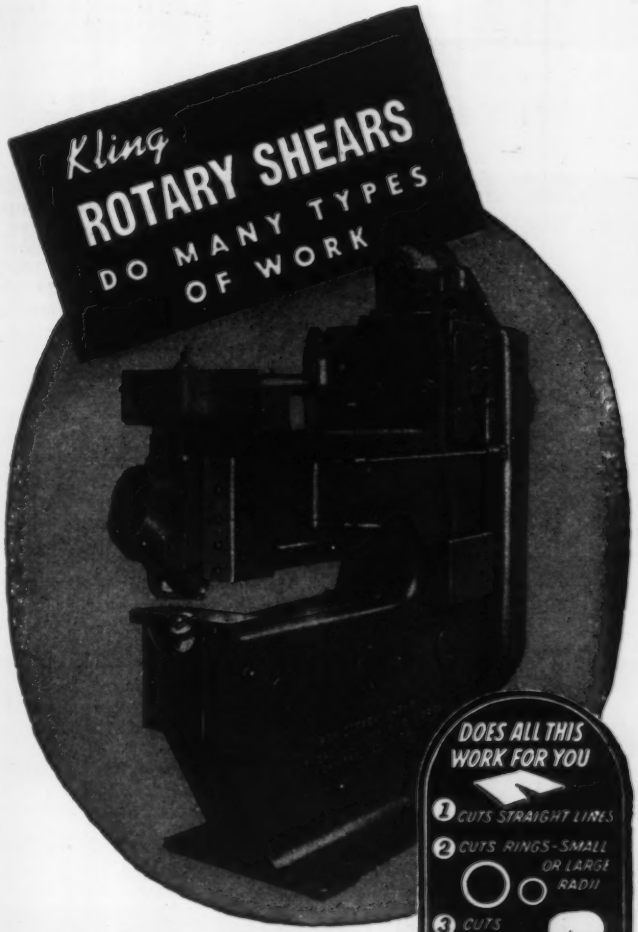

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